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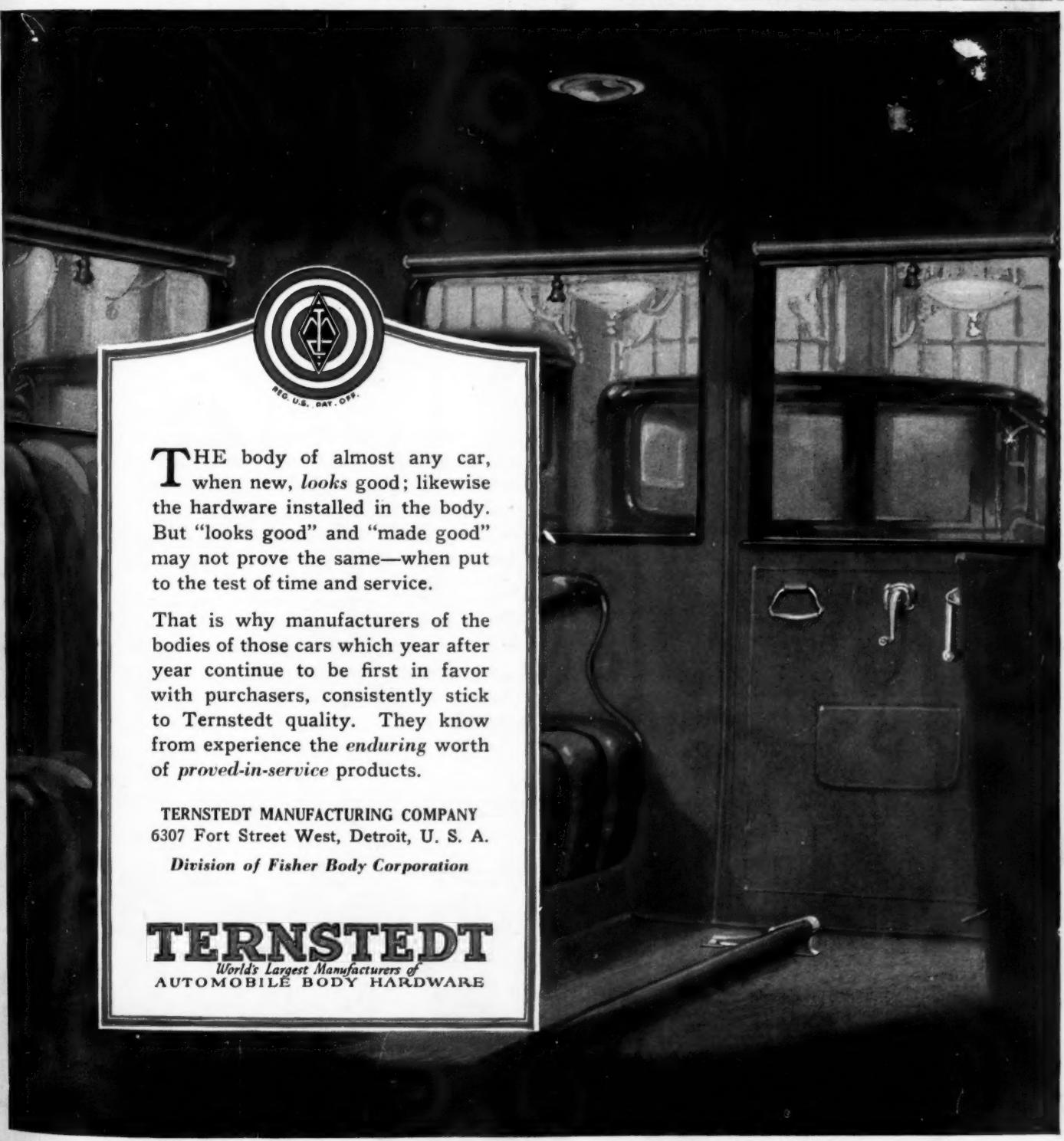
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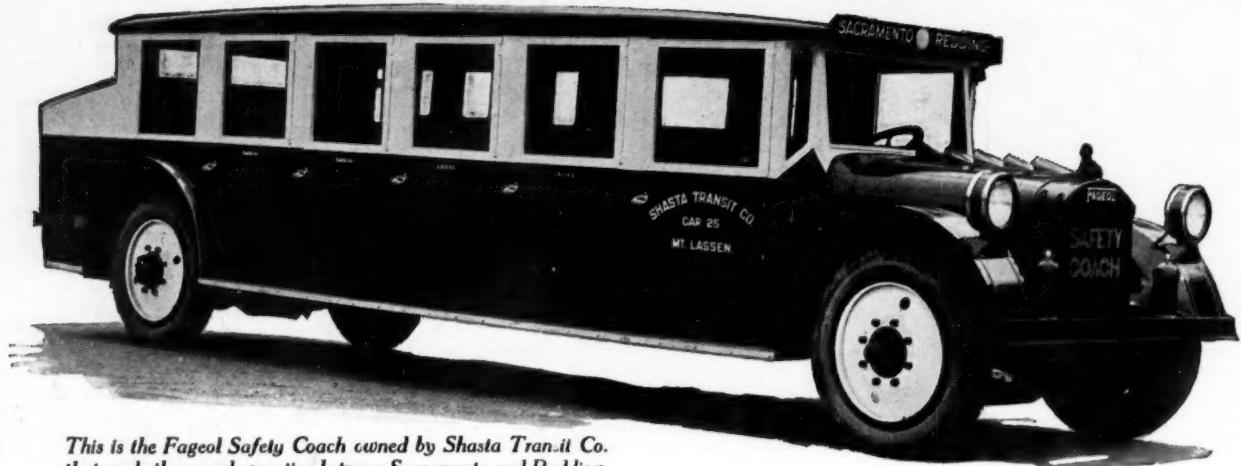


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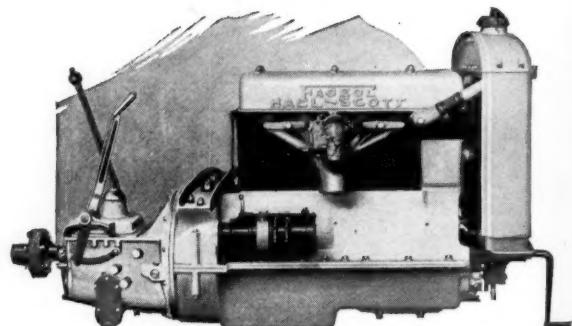
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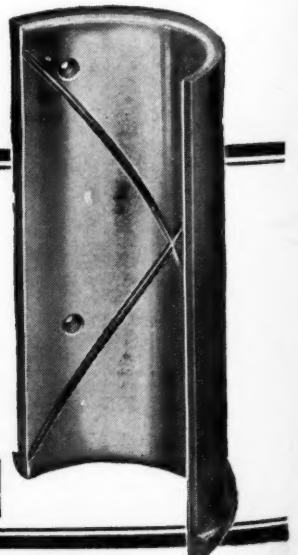
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AUTOMOTIVE INDUSTRIES

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VOL. L

NEW YORK—THURSDAY, MAY 8, 1924

No. 19

Motor Vehicles Fare Well in 1924 State Legislation

Laws still leave much to be desired but legislators are taking more constructive attitude on automotive problems.
Compulsory insurance is a moot question.

By Norman G. Shidle

LICENSE fees, compulsory insurance, common carrier taxes, truck weight and speed limitations and certificates of title are going to be the chief subjects of automotive legislation next year when forty-two State assemblies convene if developments in the eleven legislatures recently in session are shadows of coming events. Nineteen-twenty-four is what the politicians call an off-year so far as State legislatures are concerned, but the action of the eleven bodies which meet this year is important, since it indicates the sort of automotive bills likely to be advanced when the big crush begins next winter.

Taken by and large the State assemblies seem to have adopted a far more sane view of the automotive industry and the automobile driver than has been their custom in the past. Most of the bills turned out this year apparently have been based on a desire to give fair play both to the industry and the public. With one or two exceptions there has been no exhibition of direct hostility to the automobile. License fees have been increased in some cases, but lowered in others; the tendency to tax the heavy truck off the road is not so pronounced as it was a few years ago; and the argument about compulsory insurance for car and truck owners bids fair to be carried on in a frank, constructive manner.

The legislative road is not entirely clear, however, and the woods still contain a number of political snipers ready to harrass the automobile with unwarranted restrictions and with taxes based on the "all-the-traffic-will-bear" theory. Out of the eleven States which are—or have been—in session this year, automotive legislation has been constructive for the most part. Only in South Carolina have extremely heavy tax increases been laid on the car or truck.

A gratifying tendency to study motor vehicle taxation and regulation in a scientific manner seems to be growing. This indicated by the appointment in New Jersey of a special commission to study automotive taxation and by the fact that a similar body seems likely to be appointed in Massachusetts to investigate compulsory insurance. A commission has been at work on this latter question in Pennsylvania for about a year and is to report to the Pennsylvania Legislature at its next session, which is in January, 1925. No preliminary report is yet available.

Facts about the activities of the legislatures and the laws enacted thus far by the various State bodies are available through the courtesy of Russell Huffman, Secretary, Motor Vehicle Conference Committee.

The eleven State Legislatures meeting this year are:

ELEVEN state legislatures have been in session during the last few months. All but three have completed their activities for this year.

Every one of them devoted some time to automotive legislation. The action taken in these eleven states is indicative of what is likely to happen next year when forty-two state legislatures convene.

Massachusetts
Rhode Island
New York
New Jersey
Maryland
Iowa

Virginia
South Carolina
Kentucky
Mississippi
Oklahoma

All of the sessions have been completed except those of Massachusetts and Rhode Island. The Legislatures of Georgia and Louisiana are scheduled to meet later in the year. Next year every State assembly will convene with the exception of Maryland, Virginia, Kentucky, Mississippi, Georgia and Louisiana.

Compulsory insurance for automobile drivers is being urged strongly in various places as a means of making the owner financially capable of paying for any damage he may do with his car.

Compulsory Insurance Live Topic

Compulsory insurance bills were brought up and defeated in four States this year. The bill offered in Massachusetts probably will be beaten as well, although the legislative session has not yet ended and no definite statement can be made.

More compulsory insurance bills will be on the dockets of State Legislatures next year than ever before. Despite the fact that none of the proposals were enacted into law this year, there is no single subject of automotive legislation that has caused as much interest and discussion.

Thus far the automotive industry as a whole has taken no definite stand on this important question. It will have to make some decision before next fall when compulsory insurance will be a live issue in many States. Some leaders of the industry are known to favor a rather drastic compulsory insurance law as the best means of making drivers more careful. Opponents of such measures point out, on the other hand, that the man who is properly insured is less likely to care whether he has an accident or not since damages will come out of the insurance company's pocket instead of his own. "But," proponents of compulsory insurance reply "the driver who hasn't any insurance and hasn't any money either is likely to be reckless because he has nothing to lose. If he were forced to take out insurance the person damaged at least would get some financial compensation for his troubles."

It would seem that compulsory insurance, involving the annual payment of even such small sums as \$25 to \$50, might result in serious sales resistance in the passenger car field where a large proportion of the owners operate low-priced cars bought on a time payment basis.

State Insurance Possible

It might be thought off-hand that the insurance companies would be certain to favor such laws, but the possibility of the insurance being handled by State authorities makes the position of these organizations uncertain. There is a strong belief in some quarters that if compulsory insurance laws are passed the only fair way to administer them would be through the State charging on a cost basis.

These are only a few of the problems connected with compulsory insurance. The question is extremely complex and should be given very careful study by the automotive industry within the next few months.

The States in which compulsory insurance bills were defeated were:

Rhode Island
New York

New Jersey
Maryland

New Jersey has appointed a special committee of five to investigate the subject and report to the next legislature

in 1925. It is likely that Massachusetts will appoint a similar commission. The bills introduced usually provided for \$5,000 to \$10,000 personal injury or death insurance and for \$1,000 to \$2,500 property damage insurance.

Out of five States which took action on motor vehicle taxes this year, three increased the fees and two lowered them. The increases, however, were larger in the aggregate than were the reductions. The changes related to trucks or to common carriers in every case, except in South Carolina, where the passenger car rates were boosted materially along with all other motor vehicle taxes.

In Maryland the following reductions were made in the common carrier fees:

PASSENGER CARRIERS

Old Fees	New Fees
Class A — Weighing 3,000 lbs. or less, 1/20c. times seating capacity per mile	Class A — Weighing 3,000 lbs. or less, 1/20c. times seating capacity per mile
Class Bx — 3,000 lbs. to 7,000 lbs., 1/15c. times seating capacity per mile	Class Bx — 3,000 lbs to 7,000 lbs., 1/18c. times seating capacity per mile
Class Cx — Over 7,000 lbs., 1/5c. times seating capacity per mile	Class Cx — Over 7,000 lbs., 1/7c. times seating capacity per mile

PROPERTY CARRIERS

Old Fees	New Fees
Class X — Weighing 3 tons or less 1/5c. per ton mile	Class X — Weighing 3 tons or less 1/6c. per ton mile
Class Y — 3 tons to 6 tons gross 2/5c. per ton mile	Class Y — 3 tons to 6 tons gross 1/3c. per ton mile
Class Z — Over 6 tons gross 3/5c. per ton mile	Class Z — Over 6 tons gross 1/2c. per ton mile

Light Trucks Treated Favorably

The other reduction in fees was made in New York, where light trucks will have to pay less than heretofore. All trucks weighing less than 2000 lbs. previously paid an annual fee of \$16; from now those weighing less than 1800 lbs. will pay only \$12, while those weighing between 1800 and 2000 will pay \$16 as before.

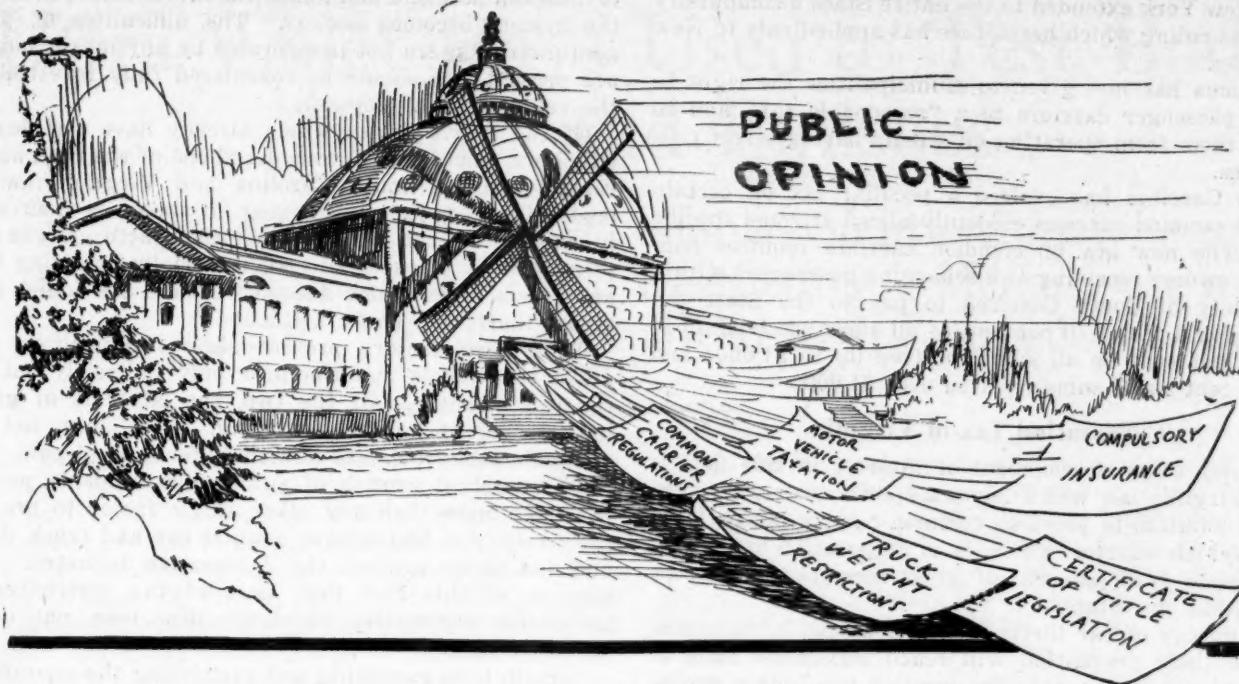
The light truck got favorable treatment in Kentucky as well, but taxes on the heavier commercial vehicles were lifted considerably by the new bill passed at the recent session. Fees on trucks weighing 1000 lbs. or less were dropped from \$22 to \$20, while those for 1000 lb.-2000 lb. units were left untouched. Increases were put into effect, however, in every other tonnage group, ranging from \$15 per truck per year in the 2000-3000 lb. class to \$25 in the 4000-5000 lb. group, and up to \$65 for those weighing between 9000 lbs. and 10,000 lbs. The Kentucky truck fee schedule as it stands today is as follows:

1,000 lbs. or less.....	\$ 20
Over 1,000 lbs. to 2,000 lbs.....	30
Over 2,000 lbs. to 3,000 lbs.....	55
Over 3,000 lbs. to 4,000 lbs.....	70
Over 4,000 lbs. to 5,000 lbs.....	85
Over 5,000 lbs. to 6,000 lbs.....	95
Over 6,000 lbs. to 7,000 lbs.....	125
Over 7,000 lbs. to 8,000 lbs.....	150
Over 8,000 lbs. to 9,000 lbs.....	185
Over 9,000 lbs. to 10,000 lbs.....	215
Over 10,000 lbs.....	215*

*Plus \$20 for each additional ton over 5 tons.

Taxes on commercial vehicles were raised in Virginia as well, but again the light delivery wagon did not suffer. Trucks weighing one ton or less still pay \$15 as before, but a graduated scale has been substituted for the heavier

State Legislative Mill Continues to Grind Out Automotive Legislation



units to replace the "\$5 for each additional ton" formerly charged. The scale in Virginia now reads:

1 ton	\$ 15	3½ ton	\$ 80
1½ ton	20	4 ton	110
2 ton	30	4½ ton	150
2½ ton	40	5 ton	200
3 ton	60		

These fees are increased by 50 per cent when the vehicle is used for hire. Thus an additional cost is involved in the operation of trucks by an independent trucking company.

South Carolina Doubles Taxes

Down in South Carolina the legislators seem to have been out to get all the money possible from the car and truck operator. Fees for all kinds of motor vehicles were practically doubled. Previous fees, moreover, were not especially low, having ranged from \$15 for 1-ton trucks up to \$350 for the 6 to 7-ton variety. Under the new law the light delivery truck has to pay \$30 a year and the 6 to 7-ton type pays \$800. Passenger car fees have been raised from \$6 to \$12 for vehicles weighing less than 2000 lbs., and from \$2 for each additional 500 lbs. to \$6.

New South Carolina truck fees follow:

1 ton or less	\$ 30
Over 1 ton to 2 tons	60
Over 2 tons to 3 tons	120
Over 3 tons to 4 tons	200
Over 4 tons to 5 tons	400
Over 5 tons to 6 tons	600
Over 6 tons to 7 tons and over	800

The extremely heavy penalties imposed on trucks weighing 4 tons or more indicate a desire on the part of the legislators to drive such vehicles from the road if possible, because the relatively small number of this type in operation renders them of no great importance from the standpoint of revenue. The discussion about heavy trucks and road damage is an old one. Economic values must be the final determining factor in sound legislation, and if the heavy truck performs a community service commensurate with its destructive effect on roads there can be no justification for excessive taxation.

The New Jersey legislature made no changes in motor vehicle fees. A gasoline tax was proposed but was defeated. Debate on various phases of automobile taxation resulted in the appointment of a commission of nine persons to study the entire problem and report to the legislature in 1925. This commission is composed of:

One Senator
One Assemblyman
The Commissioner of Motor Vehicles
One representative of each of the following organizations:

Association of Chosen Freeholders of New Jersey
New Jersey Automobile Trade Association
League of Municipalities
Motor Vehicle Association of New Jersey
Motor Truck Association of New Jersey
Good Roads Association of New Jersey

The personnel of this commission represents practically every interested party and should be able in its report to make a real contribution to the development of scientific motor vehicle taxation.

New Truck Regulations Few

Regulations on truck sizes, weights, and speeds remain about as they were, except in South Carolina, where the weight limit was cut from 8,000 to 7,000 lbs. capacity. To use larger trucks in this State now requires a special permit from the highway authority of each county in which the vehicle operates and approval of the State Highway Commissioner.

While South Carolina was restricting truck weights, Maryland raised its limit from 20,000 lbs. to 23,000 lbs. gross. It has been expected that New Jersey might lower the truck weight limit, but no such action materialized.

The relatively favorable attitude toward the motor truck evinced by a good many States indicates that the truck is rapidly winning recognition as a real factor in transportation. By demonstrating its service possibilities it is beginning to win proper recognition from its political foes as well as its friends.

Five States took important steps in connection with common carrier regulations. Kentucky passed its first motor vehicle common carrier law, imposing certain taxes

upon such vehicles in addition to the regular registration fees. New York extended to the entire State a compulsory insurance ruling which heretofore has applied only to New York City.

Oklahoma has just given to municipalities the right to subject passenger carriers to a "reasonable tax" and to prevent them from operating on streets having street railway lines.

South Carolina has evolved a peculiar tax on certain types of common carriers evidently aimed at some specific cases. The new law on common carriers requires non-resident owners receiving or discharging passengers within any county of South Carolina to pay to the State tax commission a fee of 10 per cent of all sums received up to \$500; 5 per cent on all sums received up to \$1,000; and 2½ per cent on all sums received over \$1,000.

Corporation Tax in Virginia

The only other development of interest in this field is a new Virginia law which levies a special tax on corporations in addition to previous common carrier taxes. Each motor vehicle carrier which is a corporation must pay to the State 1/10 per cent of gross receipts on business done within the State.

Continuance of car thefts makes it almost certain that ideas on theft prevention will reach legislative halls in large numbers next year. The question has been a vexing one for some time and there seems to be little hope of solving it by any single means. One method which has proved successful is that of requiring a certificate of sale to go with every car each time that it is sold.

Details of the various laws along this line differ slightly but the main features of all of them are included in the bill recently passed by South Carolina. Briefly the system is to operate as follows:

A certificate of title is issued by the State Highway Commissioner to the car owner at the time he first applies for a license on a new car. When the original owner sells his car he indorses his certificate of title just as he would indorse a check. Then he turns it over with the car to the new owner. The new owner within ten days presents the indorsed certificate to the State Highway Commissioner and receives in return a new certificate. A charge of 50 cents is made each time a new certificate is issued.

Theft Prevention Bills Passed

There can be little question that some such system as this will tend to prevent theft because it makes it a bit more difficult to dispose of a stolen car. It is apparent, however, that the value of the law lies chiefly in the efficiency of its administration. Unless the records in the

office of the State Highway Commissioner are kept up to date and accurate and unless the law is enforced strictly, the system becomes useless. The difficulties of proper administration are not insuperable by any means but they are present and should be considered fully in estimating the value of such proposals.

Of the twelve States which already have certificate of title laws, Michigan's is considered one of the best, and the recently passed South Carolina and Virginia laws are modeled after it. Each year it becomes increasingly evident that the car and truck manufacturers are going to have their markets affected materially by rising insurance costs unless some adequate means are found to decrease thefts and traffic accidents.

These two factors present serious difficulties which affect the vehicle manufacturer only indirectly but none the less strongly. Of the two, the latter is of greater importance, of course, involving, as it does, not only economic losses but also human suffering and pain.

The constant growth of automobile accidents probably has done more than any other single factor to prejudice the public and legislatures against car and truck drivers and indirectly against the automotive industry. It is because of this fact that most of the restrictive and preventive automotive legislation has been put on the statute books.

Certain laws governing and restricting the operation of motor vehicles are desirable as well as necessary. The difficulty so often in the past has been that the laws were restrictive rather than constructive. The motor vehicle is a necessary and efficient tool which fills a definite place in modern life. It is not a beast to be curbed, but a force to be directed.

Accidents Cause Unfavorable Legislation

The seriousness of the traffic accident situation is not to be denied, nevertheless, and state senators and assemblymen are certain to continue their efforts to alleviate the situation. One obvious method to do this is to increase the responsibility of the car driver; to make certain—if possible—that he is capable of operating a car properly under normal circumstances.

Licensing of operators is common practice at the present time and is obviously necessary if there is to be any practical means of holding the driver responsible.

Examination of drivers has been growing in popularity for the last few years. Examinations of various kinds are required in different places. The value of such tests is certain to be quite limited. Any examination which it is reasonable to expect can be given to hundreds of people a day at any reasonable cost to the State is not likely to give any very definite indication of the fundamental ability or disability of the individual as a motor car operator. The moral hazard is always present as is that of changing physical and mental condition.

What examination of drivers properly may seek to accomplish is the elimination from the car driving class of those obviously unfit to drive a car by reason of some permanent physical defect and of those who have not yet learned the simple rudiments of car operation. So much they may accomplish successfully; that they can accomplish more is unlikely. These are important facts to bear in mind when the cost of driver examinations is being weighed against the results produced by them. New York has extended the scope of its driver licensing regulations this year.

Compared with output of automotive legislation in some previous years, the 1924 product has many favorable points. A large amount of educational work still remains to be done by the industry but there is evidence that past efforts already are beginning to bear some fruit.

State Legislatures to Meet in 1925

Arizona	Maine	Pennsylvania
Arkansas	Michigan	South Carolina
California	Missouri	South Dakota
Colorado	Montana	Tennessee
Connecticut	Nebraska	Texas
Delaware	Nevada	Utah
Florida	New Hampshire	Vermont
Idaho	North Carolina	Washington
Illinois	North Dakota	West Virginia
Indiana	Oklahoma	Wisconsin
Iowa	Oregon	Wyoming
Kansas		

Ultra-Violet Rays Used to Test Body Fabrics and Finishes

Few hours of exposure under suitable conditions may be equal to many months of natural weathering. Mercury arc in quartz tube also employed to dry varnish.

By W. L. Carver

UPHOLSTERY fabrics, top materials, body finishes, the color characteristics and durability of which have been unknown or doubtful quantities since the beginning of the industry are approaching the point where their properties may be anticipated in the same manner as those of various other materials that enter into automotive construction. The time element which has been the chief disadvantage of outdoor exposure tests of these body materials is being reduced to a period comparable to an engine break-down test by the utilization of the quartz-tube mercury vapor lamp which emits ultra-violet rays.

These rays, which are just outside the upper end of the visible spectrum of sunlight, are highly actinic and have been responsible for the downfall of innumerable color schemes. It is possible to concentrate these rays by the use of a lens, but as compared to the quartz lamp the lens is impractical due to the greater heat evolved upon any suitable degree of concentration.

Ordinary sunlight can be resolved readily into the visible spectrum ranging from relatively long wave lengths at the lower or red end to comparatively short wave lengths at the upper or violet end. Other rays of still shorter wave length exist in the ultra-violet range which are invisible to the human eye. As the wave lengths decrease, the actinic action or ability to fade and discolor, due to radiant chemical and physical propensities, increases. This peculiar action tends to harden top materials, causing them to crack and leak.

Pigments, the coloring matter in paint, are affected and fade while the oils in both imperfect varnish and paint finishes are partially decomposed and turn gray or brittle. Body fabrics not only fade but become brittle and weak. Water in the form of moisture or dew is particularly active in conjunction with these actinic rays and hastens all forms of deterioration.

Methods and Variations Show Promise

As the highly actinic rays are but a fraction of the sun's light and are preponderant in the radiation of the mercury arc, it appears possible to approximate the effects of several years of ordinary exposure in a very short time by use of this arc. As the application of the quartz tube lamp to the investigation of automotive finishing materials is comparatively new, practice has not been standardized as yet and a considerable divergence of opinion exists. Nevertheless, methods and variations of equipment which show great promise have been evolved recently and it is therefore the purpose of this article to discuss some of these developments and bring to bear the experience of the lamp manufacturer and practice in other fields of commercial and research effort.

In spite of this divergence of opinion and practice,

two forms of lamp are in predominant use for testing purposes. In principle and operation, these lamps are similar to the familiar mercury arc lamp which is used for plant illumination, both types being made by the Cooper Hewitt Electric Co. of Hoboken, N. J. The ordinary glass inclosure tube of the illuminating type of lamp, however, is replaced by a fused quartz tube as the elements, calcium and lead which are present in glass absorb the ultra-violet rays which are present in the mercury arc, whereas these rays are completely transmitted by the quartz inclosure.

Small Space Needed

Fig. 1 illustrates the Uviarc laboratory outfit in which the quartz lamp is mounted in a shroud which can be set at any convenient angle or adjusted for height by raising or lowering on the vertical standard which terminates at its lower end in the resistance container.

Fig. 2 illustrates the Uviarc test cabinet in which the lamp is surrounded by a cylinder in which are slots and orifices to accommodate slides carrying specimens of the material to be tested. The resistance unit again is located at the lower end of the vertical standard. These lamps operate on either 110 or 220 volt direct current, although the latter is used more often. Where only alternating current is available, a mercury arc converter

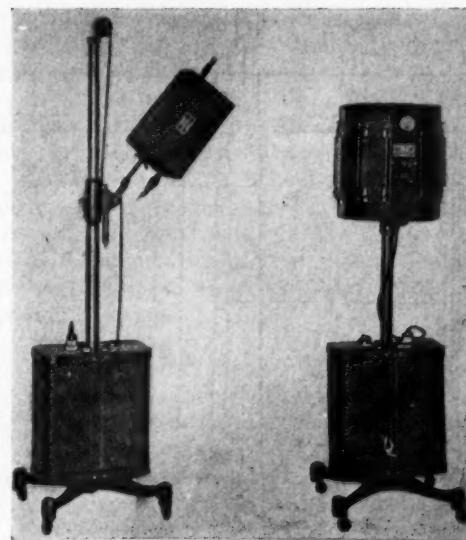


Fig. 1—Uviarc laboratory outfit. Reflector containing lamp may be set at any convenient position or angle

Fig. 2—Uviarc test cabinet. Slides containing material to be tested are placed in slots around the cylinder which houses the lamp

is provided in conjunction with the installation. Quartz lamps of a size comparable to the ordinary commercial illuminating lamps also are obtainable.

Several outfits of the two types already illustrated are now in use, although the divergence of results obtained indicates that some room is left for improvement of practice. Cooper Hewitt engineers concur in this opinion with the statement that these types of lamps with no auxiliary equipment will provide an excellent empirical index of the relative characteristics for like materials and like treatment. For example, one fabric producer has determined that for the class of goods and dyes in production at that plant, 8 hours' exposure in the test cabinet is the equivalent of 30 days' exposure to maximum or June sunlight.

Develops Comparable Results

When the fabric stands up under this test its durability is assured. In this case, fabric, dye and treatment are fixed or comparable quantities, each of the same class, therefore the ultra-violet exposure develops comparable results. This condition does not hold good, however, when one of the elements is changed. It then is necessary to develop a new standard of comparison for the new material and this standard may be entirely unrelated to that of the first class of material.

In one case a paint and varnish manufacturer is using the Uviarc laboratory outfit to test paint and varnish specimens in a water bath. The specimen which is applied on a metal strip is immersed in a shallow pan of distilled water and the lamp is placed over it in a horizontal position. This test is based on the theory that actinic rays and dew combined have a very destructive effect as is evidenced in actual experience by the blue cast of many varnish-finished cars after overnight exposure to dew. In this particular case where the various varnishes or paints are made by similar methods from the same materials, excellent comparative break-down results have been obtained, but much of the value of the test is lost when other materials are compared with the existing standards.

In another case, a car manufacturer and the manufacturer of top fabric have shown a great difference of opinion, although both of them use quartz lamp testing

equipment in their laboratories. The car manufacturer maintains that 48 hours' exposure in the test cabinet is the equivalent of two years' service in actual use.

On the other hand, the top material manufacturer states that this standard is not vindicated by outdoor exposure tests as some rather inferior materials will withstand the ultra-violet exposure and then fail very early in actual usage, whereas other samples that failed in the ultra-violet test have demonstrated their durability in service. This difference of opinion may be attributed to the fact that the same routine of ultra-violet exposure is not feasible for materials of widely different composition or characteristics. An empirical standard may be evolved for each material as the result of experience, but at this time no general standard covering all classes has been developed.

As the outgrowth of experience of this kind, some interesting equipment which more nearly approximates actual conditions has been evolved. The quartz lamp is the foundation of both of the newer developments and additional apparatus is added for the purpose of creating a general routine which will produce comparative results for materials of widely different natures. An apparatus which has been developed by the New Jersey Zinc Co. is illustrated in Fig. 3 and described as follows by Harley A. Nelson of the research staff of that company.

Simulates Different Weather Conditions

"An exposure tank (Fig. 3) has been constructed to facilitate simulation of a variation of possible weathering conditions. This tank is of wood with an insulating space and galvanized iron lining. The cover is provided with a 10-in. opening, which receives a removable collar, B supporting a quartz mercury arc A of 30 in. effective lighting length. The test panels C are supported by nails on removable racks provided with sheet zinc water drains. Water simulating a beating rain is provided by a revolving spray D, and fine fog or mist by the atomizer E.

"An ordinary variable speed electric fan serves to cool the mercury arc and maintain uniform temperature. The mercury arc, which is used on a 220-240 volt D.C. normally drawing 6-7 amp. when the atmosphere within the exposure tank is maintained at 50-60 deg. C., is especially strong just where the sun's spectrum, due to the absorption of the shorter wave lengths, falls off to practically nothing.

"This absorption by the earth's atmosphere is so great that only one-millionth of the energy possessed by a short wave length at the upper confines of the atmosphere finally reaches the earth. As illustrated by Fig. 4, the Bureau of Standards has found that the region below 4500 Angstrom units represents about 5 per cent of the sun's total radiation energy, whereas for the quartz mercury arc this region represents about 20 per cent of the total energy."

With regard to the routine of the test when examining the durability of paint when applied on either wood or metal panels, the paper continues as follows: "Obviously, it is impossible to follow the natural weathering cycle at every turn. Simplicity for routine application and observation is a factor which makes the 24-hour cycle convenient and desirable. Twenty-four hours of light (temperature 50-60 deg. C.), 24 hours of low temperature, 24 hours of water spray, followed again by 24 hours of light, etc., is a cycle which embodies the elements of simplicity and severity. However, this has not been entirely practicable during the summer months. The difficulties of refrigeration at sufficiently low temperatures led to further modification of the exposure

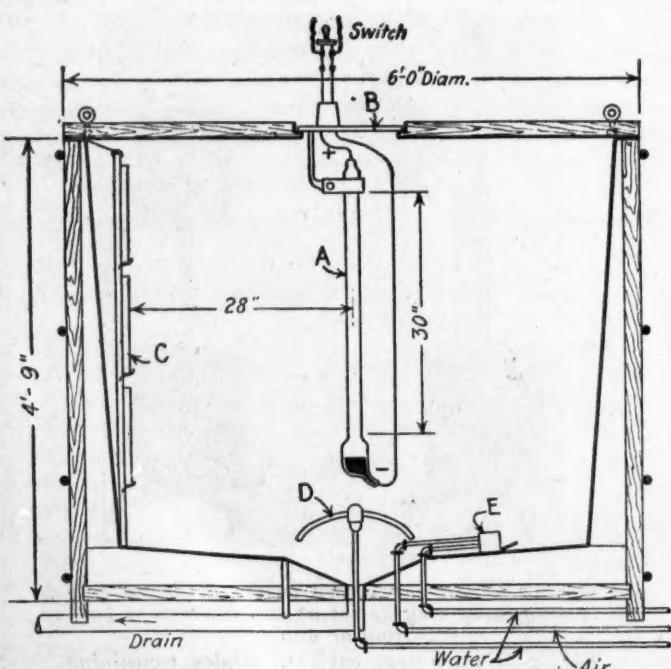


Fig. 3—Ultra-violet Ray test cabinet in use in the laboratory of the New Jersey Zinc Co.

cycle to 24 hours of light (50-60 deg. C.) cooling rapidly to the lowest available temperature, followed by 24 hours of water spray, etc."

In conclusion, this paper states: "The application of accelerated tests as a criterion of service quality in the development of a product of industry has been the source of much discussion. That there exists a general need for such tests, wherever changes with time are an indication of quality, there can be no question. But no test of this kind can take its place as an instrument in the hands of industry without itself passing the test of time. The present limitations of the test just considered must be recognized. It is a mark of progress, at the present stages of development, to know that at least some of the physical changes that characterize such a very complicated thing as the weathering of paint on exposed surfaces, can be reproduced upon an accelerated scale. The partial success gives hope of a final, more complete simulation of natural weathering."

A more recent development of the ultra-violet testing apparatus is now in use at the General Motors Research Corporation. As illustrated by Fig. 5, this installation consists primarily of a wheel of 24-in. diameter upon which the test panels are fastened. A Uviarc laboratory type of lamp is placed so that the rays are directed upon the uppermost portion of the wheel's periphery. Below the shaft center is a large pan or tank which is filled with distilled water. The wheel is rotated at the rate of 2 rev. per hr. by an electric motor through worm gear reductions, a final pair of pulleys and belt. This apparatus also is operated on a 24-hour schedule, although at the present time the lamp is switched on for only 8 hours per day.

Comparisons Made Over Period of Two Years

This apparatus is the development of Mr. H. C. Mougey after more than two years' exhaustive study and comparison of outdoor exposure tests with ultra-violet ray results. In the first step of this progress, specimens were exposed in the Uviarc test cabinet for varying periods. It was quickly determined, however, that this practice offered but little in the way of an accelerated test as finishes which showed great durability on the roof racks would fail very early in the test cabinet and vice versa. Following this, tests were made with the specimens under water, this procedure also developed glaring inconsistencies. In fact, it is pretty well established among paint manufacturers that this test is chiefly valuable on zinc-oxide or litho-phone paints and then only because this material is particularly susceptible to moisture. Its characteristics vary with every change in humidity, therefore the test under water offers a fixed standard of maximum humidity.

Following the test under water, another routine in which the specimens were soaked in water and then withdrawn and placed under the ultra-violet lamp, was attempted. Again, results were inconsistent and not at all comparable with the roof exposure tests. Finally, the present apparatus was evolved with the idea of subjecting the panels to extreme moisture conditions followed by a period in which surface moisture would drain off before exposure to the lamp.

Some progress in the direction of accelerating the results of roof exposure tests was shown, but some rather apparent discrepancies still existed. Then the plan of cutting out the lamp for all but 8 hours per day was conceived with the idea of still further simulating actual roof exposure and service conditions. In this way the combination of alternate wetting and drying with the addition of 8 hours' maximum light exposure is accomplished. The new routine has been in use for a short

time and shows great promise as up to date results on all classes of body finish have shown a much closer analogy to the results attained in the outside exposure tests.

It must not be assumed that the ultimate possibilities of accelerated ultra-violet ray testing have been reached. Developments which are in actual use at the present time indicate that every reason exists for the expectation of some sort of standardized apparatus and routine which will be capable of broad application to materials of different classes.

In addition to the cases already cited other possibilities are opened up by the use of special screens which

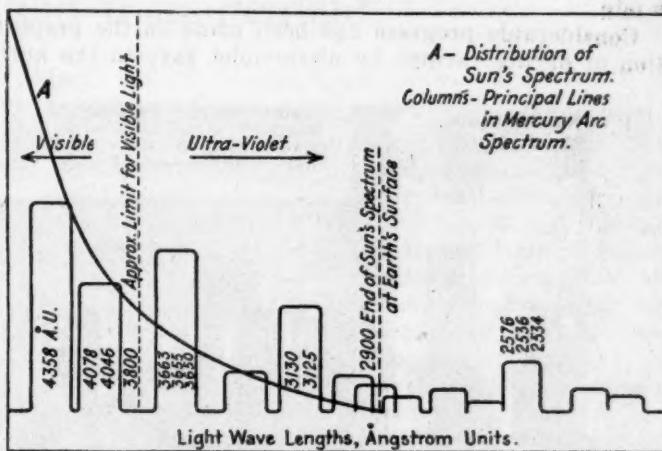


Fig. 4—Chart showing the distribution of the wave lengths in the mercury arc spectrum as compared with the upper end of the sun's spectrum

are placed between the lamp and the specimens to be tested. Cooper Hewitt engineers state that the time element and intensity of light in research work are both variables which may be affected by modifying the distance between the specimen and the lamp or interposing a screen which is usually some form of glass.

Still another purpose may be served by the screens. In some cases where the results of exposure to the lamp are very slight and almost invisible to the naked eye, a screen may be interposed for the purpose of bringing out comparative conditions. In one test which was witnessed recently, samples of artificial leather were given three exposures of different time periods.

Under normal illumination, the effects of the first two, or shorter exposures, were practically invisible, while the third, or longest exposure, showed rather definite effect. When brought into the field of the ultra-violet lamp with an interposed screen, however, the effects were very marked and varied in the order of the length of exposure. Those which were practically invisible under normal illumination apparently fell into a regular order under this condition.

Relation to Sunburn

When it is remembered that ultra-violet rays are utilized to produce artificial sunburn in a few minutes, their action on materials of any kind is more readily appreciated. The same characteristics that are valuable in research already are being applied to commercial usage in other branches and should therefore be capable of direct application to automotive production. A striking example of this application is to be found in the leather industry, where the finishing time of patent leather has been reduced from 5 hr. to 15-20 min. Patent leather derives its gloss from a varnish coating, based, like all varnishes, on the combination of oil and gums.

This process and the equipment is described as follows:

On the Japan leather drying process, quartz lamps are arranged in a stack or battery spaced about 1 ft. apart, the lamps alternating with each other in a vertical direction so as to make a complete covering of the leather. The hides are placed at 6 in. from the center line of the stack on each side, so that a burner projects light upon two hides passing. At 6 in. from the leather and an approximate distance of 6 in. apart, a very even exposure of the leather to the light results. About 3000 sq. ft. of leather have been prepared at different times of exposure to the light ranging from 30 min. down to 5 min.

Considerable progress has been made on the proposition of drying varnish by ultra-violet rays in the auto-

peratures of the first sections of the oven do not involve highly expensive oven or heating equipment. In addition to these features, the process holds promise of greater uniformity and higher quality of finish.

As the ultra-violet lamp is capable of making breakdown tests on varnishes and paints, some doubt as to its utility as a varnish "drying" agent may arise. There is an analogy between the ultra-violet method of "drying" and the usual oven or forced drying method. It is easily possible to raise the temperature of the oven to a point where the finish would be ruined, but by maintaining the correct degree of heat a perfect finish is assured. The same is true with the ultra-violet method: high intensities of exposure are conducive to destruction, while a reasonable degree of exposure and intensity facilitates production of a commercial finish of improved quality.

Several other fields also fall within the possibilities of the quartz lamp. Its use in the chemical laboratory is well established in a commercial way. The composition of some zinc ores is being controlled by a routine involving the quartz lamp and a definite procedure has been established for the analysis of some unsaturated hydrocarbons. Still another field is opened up by its ability to age paint materials, to a large extent discounting the effects of subsequent exposure. Water sterilization is also accomplished by exposure to ultra-violet rays; some plants are handling 4000 gal. per hour with a relatively small investment for equipment for this particular function. This ability would seem to open up the possibility of the sterilization of cutting compounds, although the limitation in this respect is the opaque characteristic of the liquid.

Use of Ultra-Violet Ray Only Begun

One method which is applicable to the sterilization of opaque liquids involves a wide rimmed flywheel which rotates slowly, having the lower portion of its periphery immersed in the liquid. As the rim of the flywheel rotates up out of the liquid, a rather thin film adheres, which is first subjected to the ultra-violet rays and then skimmed off into a separate container. This system has been used for bleaching linseed oil for art varnishes and should be applicable to cutting compounds.

While those engineers who are most familiar with ultra-violet research work in the automotive field do not as yet agree on all phases of its utility, there is every indication of the evolution of another form of testing materials which will include many materials which now are tested with considerable effort and delay or not at all. Use of ultra-violet rays may result in placing the materials of trimming and finishing on the same basis as the materials and assemblies which have been regarded as part of the engineering program.

Although engineering consideration of body questions has lagged behind that of the chassis, present tendencies are in the other direction and current activities indicate that ultra-violet ray research work will become an important part of the program for improving automobile bodies.

Fig. 5—Ultra-violet testing apparatus in use at the General Motors Research Laboratory

motive industry. A trial oven already has been constructed and a tentative commercial installation is now under consideration. In a general way, the arrangement amounts to tunnel type of ventilated oven in which ordinary heating facilities are provided in the first third of the length. In the second third, the resistance units of the Cooper-Hewitt lamps are placed inside of the oven to provide all or a portion of the heat. The lamps themselves are arranged in the final section of the oven, the electrical connections being made outside.

Thinning Solutions Evaporate Rapidly

In this arrangement the thinning solutions of varnish, which are usually one of the alcohols, spirits of turpentine or some petroleum distillate, are largely evaporated by the initial heating action, which also tends to harden the basic oil of the varnish, usually linseed oil. Polymerization, or the change of state which takes place in addition to oxidation when varnish hardens, is promoted by heat, but is very materially hastened by the action of ultra-violet rays.

Some question has arisen as to the relative expense of varnish drying equipment of this type when applied to the automobile body field. Cooper Hewitt engineers state that the time factor of the process is comparable to that of the leather industry as discussed above. Electric current expense is not inordinate and total operating cost can be reduced by the use of the resistance units as heating elements. If the economies of floor space and material in process also are considered, the process becomes a commercial possibility. The relatively low tem-

TESTS carried out at the Bureau of Standards during the past month at temperatures up to 1200 deg. C. on a commercial nickel-chromium-iron alloy show that the static proportional limit of this alloy in short time tests, while inferior at temperatures below 450 deg. is superior above that temperature to that of any of the many steels which have been tested. The apparatus which is being designed for continuous loading at high temperatures is nearly ready for use and a report on the subject with extensive bibliography is being prepared.

What Vocational Accountants Can Do for a Big Business

Visualization of day to day changes in stocks, cash, sales and the like is made possible by simple economical system necessary for intelligent management.

By A. R. Erskine*

President of the Studebaker Corporation of America

INVENTORY in the old days was dreaded because of the difficulties of closing down, pricing and making up balance sheets and trading accounts. Balance sheets and profit and loss statements in the comprehensive and intelligent form of the present day were unknown. Audited and certified statements such as are now commonly required were likewise unknown, and it is safe to say, perhaps, that statements really correct were seldom obtained.

Manufacturers naturally sought men skilled in accounting practice to help them out, and while such men knew more than the bookkeepers employed by the manufacturers, they had but a scant knowledge of modern accounting as we know it today. These accountants, however, enjoyed a lucrative practice, formed a profession, and studied hard.

As the first great modern industrial country, it was natural that England should first appreciate the importance of accounting and dignify men engaged in it publicly by state recognition; and she has the distinction of having created the first chartered accountant by law about two generations ago. Professional accountants were meantime practicing in the United States, and by 1896 they succeeded in having the Legislature of the Empire State pass a law recognizing the profession, under which the Board of Regents examines applicants and grants C. P. A. certificates to successful candidates. All of our forty-eight States now have C. P. A. laws. All examinations include commercial law subjects as well as accounting.

It was about 1896 that our big industries began forming, and the certified public accountants of the country have performed highly efficient and comprehensive work in the installation of new systems, improvement of existing systems, standardization of balance sheets, profit and loss statements, auditing methods, etc. Big business could not have prospered as it has without the aid of these men, and it cannot get along without them today.

Our Federal Government has used them in the formation of laws and accounting systems in connection with the Interstate Commerce Commission, the Internal Revenue Department, and many others. They have performed invaluable services for our railroads, mercantile and

“THE treasurer of a big corporation should be an expert accountant and have the courage of a lion. The real treasurer as I comprehend him is the man unafraid when danger threatens, able to say 'no' to his president or his board when occasion demands, and show them why. He should be prepared to accept dismissal rather than permit grave risks to be taken.”

financial institutions, and thousands of income tax payers depend upon them to make out their returns. Bankers, stockholders and investors demand their certification of corporation balance sheets, profit and loss statements and prospectuses

In defining the word "profession," Webster says "the three professions, or learned professions, are especially theology, law and medicine."

He includes neither chemistry, engineering nor accounting, which are so important to the conduct of business, nor the vocational accountants employed by industry who are responsible for results in individual institutions.

The controller or general auditor of a corporation should be an expert accountant. He should know the theory and practice of general accounting as well as the professional, and infinitely more about the problems of his own concern. He is the diagnostician of the business. His bump of curiosity is of abnormal development, and he takes nothing for granted. He knows what is going on. He is resourceful, courageous, aggressive, and determined to get the facts and disclose them to management. Although he is a bold man, he must be tactful in order to keep the friendship and get the cooperation of the organization. No man is stronger than the organization, and tactful men realize this. The best controller is one who calls the attention of management verbally, or by special letter, when it fails to act on a dangerous situation.

The treasurer of a big corporation should be an expert accountant, and have the courage of a lion. The real treasurer, as I comprehend him, is the man unafraid when danger threatens, able to say "no" to his president or his board when occasion demands, and show them why. He should be prepared to accept dismissal rather than permit grave risks to be taken. If the treasurers of all the corporations of America during 1919 and 1920 had been this type of man, most of the inflation and huge losses of business would have been avoided. We all know of several presidents who ran their corporations head over heels in debt during this period without realizing the significance of their actions at the time. This fact is one of the best evidences of the importance of accounting to management that I can cite.

The responsibility rests on the controller in cooperation with the treasurer of every corporation for the character of its accounting system, for therein lies the secret

*Excerpts from an address made before the Illinois Manufacturers Association.

of success. Some systems are almost choked to death with red tape. They anger the production and sales departments, puzzle the accounting forces, cost a barrel of money, and are Greek to the management. Capable controllers will not permit such systems to endure. To be of real value, accounting systems must be comprehensive, simple and economical. They must not clutter up the factory with time tickets, material tickets and other minutiae. Departmental records must be kept only as the basis for operating reports that are actually required by management. When the cost of keeping records and making reports exceeds the loss that might be sustained without them, they become inadvisable.

Big business generally is equipped with efficient accounting systems which comprise, in brief, (1) original records kept in different departments showing receipt and disbursement of money; purchasing, stocking and use of materials and supplies for production, construction and equipment; the movement of finished goods; and collection and payment of accounts; (2) operating reports made from said records for the information of management; and (3) financial reports for the information of management, directors and stockholders.

Reports Must Be Used Intelligently

These reports, made daily, weekly and monthly, show what has happened in the business. Unless management thoroughly understands them, however, and uses them to correct wrong conditions and take further advantage of opportunities they disclose, their value is diminished. Management should possess at least a good working knowledge of accounting.

The possession of even brilliant talent for manufacturing or selling or both is not enough. There are many details of big business which management must watch vigilantly. Plant equipment and methods of manufacture may be economical and proper or otherwise. The number of employees, salary and wage rolls, kinds and cost of materials, costs and prices of product, markets and sales efforts, financial condition and profits, are always live questions.

Reports from the accounting department disclose the facts concerning them all. Every member of management from the foreman up to the president should be an analyzer of reports and a seeker after improvements. These things illustrate the importance of accounting to management. They show why it is impossible to conduct a business intelligently and successfully without an adequate accounting system.

Small Concerns Have Difficult Problems

While such systems generally prevail in big corporations, many smaller concerns are woefully lacking in accounting facilities. Such concerns will bond their cashier to prevent him from stealing the cash in the bank or the cash drawer and maintain no checks whatever on their inventories or receivables which usually represent three-fourths or more of their total assets. On the theory that a dollar saved is a dollar made, they spend money reluctantly. They think only of amounts and never in percentages.

When sales can be increased by an increase in the amount of expenses without increasing the expense ratio, they seldom appreciate the opportunity. When new machinery or new methods will justify the scrapping of old equipment, they may never realize it. Modern accounting methods are adaptable to such concerns, whether they be engaged in manufacturing, jobbing or retailing, and

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will pay their cost if operating reports are properly utilized by the management. It is my conviction that efficient accounting systems applied to business generally in the United States and used intelligently by management would save scores of millions of dollars annually.

Confidence Should Be Maintained

In conclusion, I would like to make brief reference to the present state of business. Our production, transportation and distribution activities are the source of our wealth, employment, wages and happiness. I always like to define business as "organized society working to produce and distribute the things it needs." If this definition be accepted, then obviously any interference with society in its activity is an injury to everybody in the country.

It is awfully easy to disturb business by undermining confidence. When this is done, unemployment ensues, with the misery it entails. For the past ninety days, the country has been flooded with bearish propaganda deliberately intended to undermine confidence, frighten security holders and hurt the business of the country. It is still being carried on. It was and is distinctly and deliberately hostile to the business of the country, to the prosperity of the nation and to the happiness of our people. A prominent financial magazine has just described the cumulative effect of bear raids on the stock market. It says:

"As pressure is put upon the stock market, there is less optimism, then more pessimism, then loss of confidence, decreased buying power, reduction of gross business with consequent increase in overhead, which means lower net earnings. These factors in turn frequently force reductions in dividends, and this has an even more depressing effect upon stock prices. It is a vicious process. Short selling does not destroy confidence, but raiding the market does, particularly when it is accomplished by propaganda originated by and intended to aid bear operators. The bear may claim that it is just as illegitimate to boost stocks unduly, but a creation of artificial values on the bull side does not have such a detrimental effect in the way of injury to business and creation of unemployment."

Big Business Performs Useful Service

Business is frequently assailed and sometimes penalized because it is big, whereas the truth is that our big industries are the very ones that have made our country what it is. Big business is the difference between the United States and the rest of the world. America was not industrially great with its small industries of thirty years ago. I remember when industrial workers were making from 10 to 20 cents per hour, when a few owned their homes, and men with bicycles were considered fortunate.

Big business has made it possible for workers to own modern homes, automobiles, talking machines and radios. Big business has made necessities out of luxuries by mass production which put them within the reach of the average man. Big business has advanced the living standard of America to a level hitherto unknown in history. It has converted America into the world's greatest industrial nation and made our big cities what they are.

All great modern nations have been industrial nations, and industry is the life-blood of this nation. Big business, lawfully conducted, is the greatest asset of the nation. Every governmental agency and the power of the people should always be exerted toward its maintenance and prosperity.

PERMANENT magnets show quite appreciable differences in magnetic qualities in the direction of rolling of the steel and at right angles thereto. In practice permanent magnets are always so designed that the flux runs in the direction of rolling.

New Landis Grinder Has Stationary Head

Designed to meet the demand for oversize, precision grinding with long-lived, speed production. Number of pieces ground per dressing of the wheel said to offset higher initial cost.

A NEW high traverse, high production grinding machine embodying a number of new and unusual features has recently been brought out by the Landis Tool Co., Waynesboro, Pa. This machine was designed for use, primarily, on small work up to 1½ in. diameter. It is a departure from the usual Landis design in that the grinding wheel head is stationary while the work carriage is traversed. It is always advisable to traverse the lighter weight, which in this particular case happens to be the work carriage, as the machine carries a large diameter grinding wheel with a correspondingly heavy wheel head.

The carriage is carried on two V-guides with chilled surfaces to insure proper alignment regardless of the traverse speed. These guide bearings, which are protected from grit and water, are lubricated from oil reservoirs with rollers located at intervals in the bed.

A special hydraulic drive, which furnishes power for traversing the work carriage, permits any desired speed from 6 in. up to 40 ft. per min. This speed is controlled by a regulating valve located on the front of the machine near the operator. The oil pressure is applied in the oil cylinder through a leverage arrangement which increases the power applied to the traversing carriage, thus permitting a much lower oil pressure, which in turn eliminates the need for excessive packing around the valves and joints to prevent leakage. The reversing valve, which is of the balanced piston type, is claimed to insure smooth motion of the carriage at all speeds. A device incorporated in the reversing mechanism is claimed to permit reversal at the highest speed without shock or vibration of the carriage.

The starting and stopping lever on the extreme left is connected to the control valve so that it is possible by a

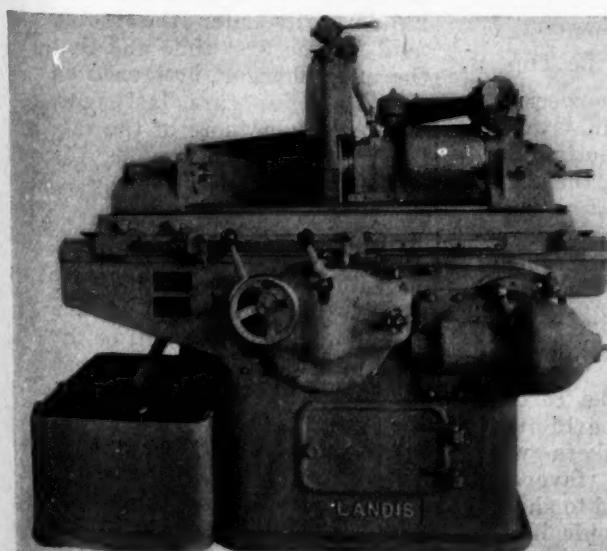
slight movement of this lever to control the traverse by hand, stopping it entirely without stopping the work if so desired. Oil pressure is furnished by a geared pump driven from the rear drive shaft and the entire base of the machine is used as a container for the oil, which not only eliminates an extra tank but also adds weight and stability to the machine.

The work speeds, ranging from 150 to 800 r.p.m., are obtained by shifting a single operating lever at the side of the operator. This lever operates a shifting key through a series of silent chain sprockets running in oil. The entire speed change mechanism is in a single unit and power is supplied to this unit through a belt from the rear drive shaft.

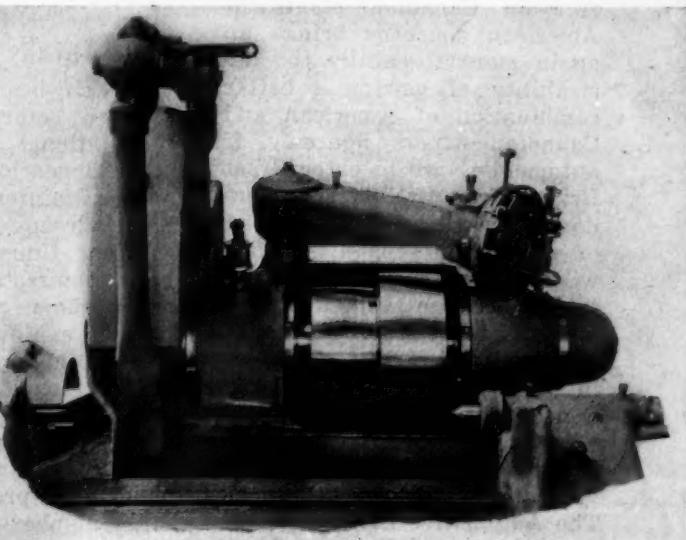
This machine departs from accepted grinding practice in that a 24-in. diameter grinding wheel is used. Up to the present time an 18-in. wheel was considered the maximum on machines used for small work, but it is claimed that the fact that a greater number of pieces can be ground per dressing of the wheel more than offsets the high initial wheel cost.

The grinding wheel feed is either automatic or by hand, and this feed-up mechanism is the same as on the past Landis grinding machines. This type hand feed allows the operator to stand in his natural position as well as affording him an unobstructed view of the grinding wheel when bringing it towards the work.

This machine can be arranged for either lineshaft or direct motor drive. For motor drive the motor is directly connected to the rear drive shaft through a flexible coupling. For lineshaft drive, a simple and adjustable countershaft with tight and loose pulleys is provided and the drive is through a single belt from this countershaft to the pulley on the rear drive shaft.



Landis hydraulic grinding machine, which has hydraulic drive for work carriage



Detail view of wheel head with driving pulley guard removed

Just Among Ourselves

Organized Study of Traffic Problems Begun

THE Hoover traffic safety conference in Washington and the gathering held recently in New Haven on the same topic, give an excellent indication of a growing recognition of the immediate practical importance of this problem. The Hoover meeting was called under the auspices of the U. S. Chamber of Commerce, while the New Haven gathering was sponsored by Yale University and the State of Connecticut. The former meeting seems likely to result in a big national convention dealing with various phases of the traffic and highway accident questions, while the latter ended up with the appointment of a committee to design methods of continuing and furthering the study of these topics. Such investigations should be of considerable benefit to the automotive industry and to the general public so long as duplication of effort does not arise.

Coordination of U. S. and Canadian Export Figures

PROBABLE lifting of British tariffs on automobiles on Aug. 1 and the subsequent effect on Canadian plants of American concerns brings up again more forcefully the desirability of getting a better combination of American and Canadian export figures. If automobiles are to enter Great Britain free of duty there undoubtedly will be some shifting of production schedules which will result in a shift of export totals between United States and Canada. Minor economic and business factors are causing similar shifts all the time. Consequently one set of figures without the other is very likely to be misleading. To be of real value they must be combined. The Automotive Division is endeavoring to work out a closer

coordination of the two sets of export totals and it is to be hoped that their efforts meet with success.

Cole Says Sales Costs Must Be Reduced Quickly

IT has been evident to close observers for several years that future economies in the automotive industry were likely to come for the most part in a reduction of marketing cost. A good many learned dissertations have been written on this subject and some definite action has resulted within recent months. Probably no more pointed statement has been made public than that of J. J. Cole, president Cole Motor Car Co., who said recently: "Generally speaking the automobile industry is in good shape, but we have all been bent over the drafting board so long that we have forgotten there is such a thing as a thinking public. The day is at hand when advertising space filled with a new method of bending a cotter pin is going to cause a negative buying reaction. Micrometers won't sell automobiles from here on. We have got to cut the cost of selling and do it quickly."

Maintenance Equipment Show Already Over the Top

WITH nearly two weeks to go before their opening, the National Automotive Service Convention and the Automotive Maintenance Equipment Show already are assured successes. Unusual interest has been manifested in the equipment show particularly and over 95 exhibitors have signed up at the present time for enough space to take care of expenses for the exhibition. The equipment makers were quick to sense the favorable opportunity presented to show a large number of people in the industry what service really

means. The educational features of this first exhibit may outweigh the immediate business phases, but the basic value will be very great. It seems likely that future shows will develop active and immediate support from all branches of the industry.

Indianapolis Race Draws Good Entry List

DESPITE the fact that American manufacturers of stock models have not participated in the Indianapolis race to any great extent for a number of years, the entry list for this racing classic continues to furnish plenty of excitement and thrills year after year. Some 22 speed demons already have entered for the 1924 trial, which takes place May 30 at the same old stand. Differences with the American Legion which followed the holding of the last race, have been ironed out and a highly successful race is expected. Duesenberg is promising some more interesting designs specially built for the race, while the Miller products probably will complete the American quota. Foreign entries will predominate. There is a possibility that one important stock passenger car builder will enter the racing field for the first time and that the supercharger, first used on the Mercedes cars last year, will appear on more of the racing jobs this year.

Allison Now in Complete Charge of Speedway Classic

THE Speedway race at the end of this month will be the first in which Carl Fisher has not had a hand. Prominent in the promotion of racing for many years, Mr. Fisher has relinquished his activities in the North and will devote his time to his various interests in the vicinity of Miami. The big

More or Less Pertinent Comment on Topics of Current Interest to Men in the Industry

event will be in charge of James A. Allison, however, who has been Mr. Fisher's partner in the venture since the beginning.

Movies and Radio Used in Automotive Merchandising

MOVING picture shows for individual prospects is the latest selling idea inaugurated by Chevrolet. The dealer salesman is equipped with a compact portable motion picture camera and a roll of films. He makes an appointment to go to the home of the prospect and there sets up his apparatus and shows the pictorial story of the Chevrolet car. The complete outfit costs between \$300 and \$400 and thus comes within the means of a large number of moderate-sized dealers. Radio also is being utilized to get publicity for automotive concerns. Numerous talks on automotive topics of public interest are being broadcasted weekly in various parts of the country. One of the first attempts by a motor truck builder to use the radio for publicity took place last week when R. A. Hauer, manager of the bus department of Mack Trucks, Inc., broadcasted a talk on "Highway Passenger Transportation" from WEAF in New York City.

Pity the Poor Taxicab and Its Load of Taxes

THE taxicab for hire is much more heavily loaded with taxes in many communities than with passengers. We sometimes wonder how they can carry the burden and still show a profit. Here are some of the levies they have to pay: Federal excise on vehicle; Federal excise on tires and parts; Federal tax on cars for hire; State fee on cars for hire; State owner's tax; State operator for hire tax; State car for hire fee; State personal property tax; State gasoline tax; municipal wheel tax; municipal common carrier tax; local tax

on place of business; franchise tax; general taxes on corporations, incomes, etc. In addition New York State, at least, makes them take out a liability bond for damages to persons and property! It certainly is a hard world for the taxicab operator.

Eight-in-line Engines Likely to Grow in Numbers

THERE are indications that the eight-in-line engine is going to dispute the limelight with the six-cylinder jobs during the next year or two. Manufacturers in nearly every price class except the lowest are known to be experimenting with this type and it is altogether likely that several lines will carry new eight-in-line powerplants in their 1925 models either to replace previous lines or as additions to models already in production.

More Congressional Investigations Urged

IT begins to look as though Congress would have to sit in perpetual session if it is to finish all the investigations started and proposed. The Muscle Shoals project may get before a joint investigating committee before it is disposed of if the recommendations of the American Engineering Council are accepted. This body, in a report prepared at the behest of Senator Norris, urges that no disposition be made of Muscle Shoals until a thorough investigation has been made by a Joint Committee of Congress. The report goes on to state that the committee of the A. E. C. "found it impossible in the time available to sift out from the mass of conflicting testimony and information, sufficient undisputed and determinable data upon which to base a sound engineering recommendation as to the disposition or use of the property." Doubtless the recommendations of this committee are

entirely sound, but the thought occurs that a Congressional investigating committee probably would find it even more difficult than did a group of trained engineers to "sift out data upon which to base a sound engineering recommendation."

Fancy Turns Various Ways in the Springtime

WHILE the young man's fancy may be turning to its legendary paths at this time of year as usual, the automotive mind has developed an unusual bent for the generation of rumors of all kinds. The number of rumors this year seems to vary directly with the size of the company involved. Speculation about possible changes in General Motors' lines takes some new form each day.

Persistent rumors that Buick is likely to abandon the valve-in-head type of engine or at least add an L-head model to its line, have been just as persistently denied by Buick officials. In a recent letter H. H. Bassett, the Buick president, says regarding the report that it has "absolutely no foundation whatever."

Volume and Profit Do Not Always Go Hand in Hand

ANALYSIS of the production and earnings of several important companies for the first quarter of 1924 shows that profits do not vary directly with the volume. Detailed figures on earnings are available for only a few companies, but those which have been published show smaller returns than in the same quarter last year in practically every case. Total car and truck production for the first quarter of 1924, on the other hand, exceeded that of the first quarter of 1923 by nearly 165,000. The relation between production schedules and earning capacity is not nearly so direct as has been generally thought in some quarters.

N. G. S.

English Engineers Define Terms for Discussion of Internal Combustion Engines

Acquire data for making calculations of ideal efficiency.

Claim it is a mistake to assume air as a working fluid with constant specific heats. Working formulae offered.

THE Committee of the Institution of Civil Engineers in England met in London recently to discuss the Standards of Comparison in Connection with the Thermal Efficiency of Internal Combustion Engines.

The air cycle efficiency theory, in which air is regarded as the ideal working fluid with specific heat constant, has served as a standard of comparison in the gas engine industry since 1903, though it was definitely stated at that time that these conclusions were regarded as a temporary expedient only.

Since then considerable research work has been done and data collected on the processes taking place in internal combustion engines. Discussion at the meeting was introduced by a paper on the subject by J. James Wells.

After mentioning various ideal cycles on which the internal combustion engine can be operated, Mr. Wells called attention to the working fluid.

While tables were available giving the properties of steam, ammonia, carbonic acid gas, etc., the internal combustion engineer, he said, still lacked similar data for his working fluid, and in his calculations of ideal efficiency was open to arrive at a seriously wrong result by assuming with the 1903 committee that that fluid was air having constant specific heats.

Tests to Determine Specific Heat

Various experimenters had examined the actual working fluids of internal combustion engines with a view to determining their specific heats, and there was considerable unanimity as to the form of the equations governing their variation with temperature. It was generally agreed that the specific heats at constant pressure C_p and at constant volume C_v could be expressed by

$$C_p = a + sT + uT^2 \text{ and}$$

$$C_v = b + sT + uT^2,$$

in which a , b , s and u were constants. These equations represented the apparent rather than the actual specific heats, for at high temperatures there was a dissociation effect which influenced the results of the experiments, but which could not be isolated from the other portion of the heat taken in by the fluids.

Wimperis and Clerk had adopted two-term formulas, the former giving

$$C_v = 0.1515 + 0.000075 T \text{ and}$$

$$C_p = 0.2225 + 0.000075 T,$$

and the latter

$$C_v = 0.18 + 0.000051 T \text{ and}$$

$$C_p = 0.251 + 0.000051 T.$$

Stodola used the three-term form and gave

$$C_v = 0.167 + 0.000062 T - 0.725 \times 10^{-8} T^2$$

$$\text{and } C_p = 0.2377 + 0.000062 T - 0.725 \times 10^{-8} T^2.$$

In all three instances the specific heats were in Centigrade heat units per pound.

At first sight these equations did not appear to promise much agreement, but it had been shown by Dr. T. B. Morley that for an Otto cycle with a maximum temperature of 1600 deg. Cent. and a compression ratio of 6 they

gave almost identical figures for the ideal efficiency, namely, 0.44, 0.435, and 0.45 respectively. Under the same conditions the air standard showed the ideal efficiency to be 0.512.

In addition, in the gas equation $PV = RT$, R was identical with $J \times (C_p - C_v)$, where J was Joule's equivalent (= 1400 Centigrade heat units per pound). For the three formulas $C_p - C_v$ was identical at 0.071, so that R had the value 99.4, or 99 in round numbers. The gas equation could thus be written $PV = 99 T$, with P in pounds per square foot, V the volume in cubic feet per pound, and T the absolute temperature Centigrade.

Calculating Energy Content of Fluid

Mr. Wells then proceeded to show how by means of this gas equation the internal energy and total heat of the fluid could be calculated at any temperature, and described the construction and use of a nomogram or alignment chart whereby these properties and the temperature of the fluid could be read off if the pressure and volume of the fluid were known.

In the discussion Sir Dugald Clerk, while agreeing that the real working fluid and not an ideal fluid should be used as the basis of calculating the ideal efficiency, held that the use of air of constant specific heats gave a method of obtaining an immediate result, for all that was required was a knowledge of the volume of the fluid before and after compression. It was very desirable to determine the nature of the actual working fluid, but he thought that the difficulties in the way of using it as the standard fluid would for some time leave air as the more useful substance.

He held that, in view of the phenomenon of delayed combustion, it was necessary that the ideal cycle should be taken as covering the same range of temperature as the actual, although it would be necessary to have regard to the type of engine and the nature of the working fluid. It was possible to measure the suction temperature, but the problem was difficult. As regarded the formulas for the specific heats, he thought that we were not yet in a position to give a standard form. The alignment chart method proposed by Mr. Wells was very good.

Problem of Suction Temperature

Prof. W. E. Dalby said that the problem of the suction temperature still remained open, and the practical difficulties of using a standard other than air were yet to be overcome. Although such a standard could be used—as was shown in the paper—it could not be used without involving assumptions regarding the suction temperature, and more calculation than practical engineers were likely to undertake. This, of course, was no reason why the present committee should not continue its labors and get together all the information which was available.

B. Pochobradsky stated that the 1903 committee, by its references to gramme molecules and volumetric heat, showed considerable foresight, and that these two con-

ceptions, rightly applied, would take us farther than Mr. Wells' paper. In the gas equation $PV = RT$, if V were made the gramme molecule volume, R was constant for all gases, and the nomogram chart, if compiled on a gramme molecule basis, would also apply to all gases. The volumetric heat was equal to the specific heat per gramme molecule, and was the same for all gases. Similarly, the entropy was the same.

On this basis the specific heat at constant pressure for all diatomic gases had the form $a + bT$ with a similar form, but different constants for the specific heat at constant volume. For multi-atomic gases the specific heat took the form $A + BT + CT^2$. In internal combustion engines diatomic gases predominated. He therefore urged that the use of pounds, etc., should be given up and that all calculations and diagrams should be transformed onto the gramme molecule basis.

W. G. Shilling referred to a monograph which would shortly be published and which would give for the first time a complete and critical survey of the work done on specific heats from 1788 up to the present year. Assuming corrected values in the characteristic gas equation,

he had found the value of R in Centigrade heat units to be 96. In the formula $a + bT + cT^2$ he did not think that the T^2 term could be omitted if accurate results were required. There was no doubt that if the molecular unit were adopted and a common system of units used it would be much easier for the chemist, physicist and engineer to work together on the solution of internal combustion engine problems.

R. H. Parsons criticized the assertion made by Mr. Wells that there was unanimity as to the form of the formulas for the specific heats of the working fluid. The fact that two of the formulas had two terms and the third three did not look like unanimity. Even though the three-term formula were generally favored, it would not imply unanimity, for such a form was always adopted to express experimental results of all kinds when there was doubt as to the true form. It was an accommodating type of formula, but it was not safe to extrapolate from it. In Stodola's case the third term had a negative coefficient, and that fact seemed to him to be irrational, as it implied that the specific heats became zero at some high temperature—round about 5000 deg. Cent.

A Quick Means for Measuring Dilution

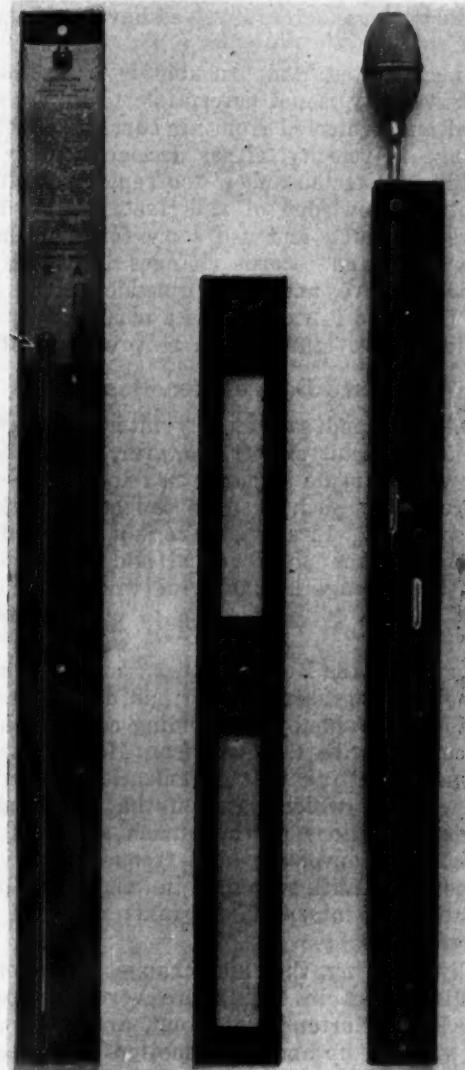
A N instrument which affords a quick means of measuring dilution without resort to distillation or viscometer and stop-watch methods has been placed on the market recently by Gordon & Hower of 164 Chandler Street, Buffalo, N. Y. It is based upon the fact that a bubble of air will rise through a tube containing a column of air in a time which is dependent, at least in part, upon the viscosity of the oil. Since the viscosity decreases as the oil becomes diluted, the rate at which the bubble rises will increase as the percentage of dilution increases.

In the instrument in question there are two tubes. One is sealed and contains a standard sample of oil. It is marked *A*. A second and considerably longer tube marked *B* is located beside *A* tube with one end approximately in line with one end of *A*. Tube *B* is sealed at one end and is provided with a stopper which makes it possible to close the open end.

The diluted sample of oil is placed in the longer tube, the latter being filled to the level of a slot cut in the instrument mounting. The stopper then is inserted and traps a bubble of air in the upper end of the tube. When the instrument is inverted the bubbles in both tubes rise toward the other end of the tubes. If the bubble in tube *B* arrives at the end of its tube before that in tube *A* reaches the end of its tube, the oil under test in *B* has been so far diluted as to be considered unsafe for further use. If, however, the bubble in *B* tube does not reach the end before that in *A* tube, *B* oil is considered still to be usable with safety.

The tubes are so arranged that it is possible to look through them toward the light. The relative length of the tubes is presumed to be based upon recommendations of the engine manufacturer as to what degree of dilution is permissible with the particular oil, the reference oil being that which he recommends for use in the engine. The oil in both tubes should be at the same (approximately room) temperature or 70 deg. Fahr. before the test is made.

If the two oils are not at the same temperature, results may be misleading. The temperature can be equalized by immersing the tubes, after they are filled, in a bath of water.



Simple instrument determines whether or not it is safe to use oil again

Riding Qualities Depend on Proper Combination of Many Factors

Rate of vertical acceleration is one of the most important and can be measured with suitable instrument. Difficulties are encountered in interpreting results because of lack of data concerning physiological and psychological reactions.

By Herbert Chase

NOBODY who has studied riding comfort thus far has been bold enough to attempt the preparation of an exact definition of good riding qualities or even to assign reasonable values to various factors which are known to affect riding comfort.

That such a condition can exist in this day when motor vehicles have become a highly developed product is sufficient evidence of the fact that the items which contribute to riding comfort and discomfort are not well understood, or, at least, that such attempts as have been made to evaluate the various factors involved have not been notably successful.

It has been stated, and probably is true, that motion at uniform velocity is not perceptible to a person who is blindfolded and protected from air currents, but that any rapid change in velocity, either deceleration or acceleration, readily is detected and if too rapid is decidedly uncomfortable. Knowledge of this fact has led many investigators to design and use some form of instrument which measures and records changes in velocity, either positive or negative, and it is probable that a graphical record of this kind is valuable as a means of determining ease of riding, providing it can be properly interpreted.

Lack Data on Reactions

An intelligent and satisfactory interpretation of such a record is a difficult matter, however, partly because it is not known how rapid a change in velocity is permissible or how frequently such changes can occur without producing discomfort. In short, there is a lack of data tending to establish the physiological and psychological reactions of the average human being when he is subjected to certain outside forces tending to change his rate of motion.

For this reason the Research Department of the Society of Automotive Engineers, which has decided to make a study of the general subject of riding comfort, has established a contact with the American Medical Association in the hope of getting that organization to arrange for research work in which data on the physiological and psychological reactions of the human system to various rates of change in velocity and frequency of vibrations will be recorded. With such data in hand it will be a much easier matter to interpret diagrams obtained with an accelerometer.

Generally speaking, the chief changes in velocity which produce discomfort in riding are vertical accelerations which, as F. H. Norton* points out, are produced chiefly either by straight up and down motion of the body or by fore and aft pitching about a transverse horizontal axis.

Hence an instrument which will measure such accelerations should be useful in learning at least one of the most important if not the chief factor upon which ease of riding depends.

Some of the Difficulties Encountered

A number of such instruments have been designed and used with more or less success, so far as obtaining records is concerned, but the rub comes when an effort is made to interpret the diagram. A properly designed instrument will permit of readings of acceleration rates, but the question immediately arises as to what rate is permissible without discomfort. Obviously much will depend also upon the location of the instrument in the car, the method by which it is carried or attached to the vehicle or seat, the kind of surface over which the vehicle is passing, the speed of the vehicle in a horizontal direction, etc.

Mr. Norton, who has given much study to the design and use of instruments of this kind in making records of airplane performance, advocates carrying the instrument which he has built for use in measuring riding qualities of cars in the lap of the passenger and thus partly insulating it from the small tremors or vibrations which often are transmitted from the engine to the floor of the vehicle and thence to the feet and body of passengers. It is an open question, however, whether such small high frequency vibrations as these are not responsible, at least in part, for the fatigue or discomfort experienced in certain types of vehicles, such as motor railcars for example.

What Tests Would Indicate

Data resulting from tests made by Mr. Norton with two cars, one a light and one a medium weight sedan, operated over the same stretch of road and similar tests on railway, trolley and subway coaches running over average track are summarized by him in part as follows:

1. The greatest vertical acceleration encountered was 2.45 g., which felt like a very severe jolt.
2. The effect of the car speed on vertical acceleration depends on the road; on a smooth road there is little difference between 10 and 30 m.p.h., but on rough roads the vertical acceleration is less at 20 m.p.h. than at 10 or 30 m.p.h.
3. The heavier car at high speeds and on the rougher roads showed greater accelerations than the lighter one, while at low speed and on smooth roads the reverse was true.
4. Railroad, trolley and subway cars showed vertical accelerations of about the same magnitude as automobiles driven on the smoothest roads.

The following method of approach in studying riding comfort is suggested by Mr. Norton:

"In the first place, some laboratory tests should be made to determine some of the psychological and physiological effects of riding shocks. For example, does the rate of change of acceleration, the duration of the acceleration, or a series of equal shocks affect the riding comfort? For a given intensity, do some components of acceleration feel more uncomfortable than others? What effect does noise and the consciousness of displacement by sight have on the comfort of the passenger?

"Secondly, the support of the passenger in the car should be carefully considered. What share does the seat, the back, the floor and the sides contribute to the forces imparted to the passenger? What is the difference between rough and smooth seat covers? Would a spring mounting of the seat back and the foot rest make easier riding? Would a belt like an airplane safety belt make the passenger more comfortable?

"Thirdly, the spring suspension of the car should be studied to answer many important questions. What is the effect on the riding qualities of the wheelbase length, the unsprung weight, the types of tire, the spring period and deflection of snubbers and shock absorbers? What is the best ratio for the periods of the front and rear springs?

"And last, the effect produced by various kinds of road irregularity is important not only from the standpoint of better roads, but also to aid in designing more comfortable cars. What is the effect of the car speed on a given bump? What is the effect of the type of bump, a series of repeated bumps, such as cobblestones or deep ruts? To obtain consistent results a smooth track with standardized bumps must be used."

Develops Accelerometer to Meet Needs

A neat and exceptionally compact form of accelerometer developed by Mr. Norton is shown in the accompanying cut and described by him as follows:

The flat cantilever spring *a* is rigidly fastened at one end to the spring base *b*. Accelerations acting at right angles to the plane of the spring will move the free end slightly. This motion is transmitted by the hardened steel stylus *c* to the platform of the rocking mirror *d*, where it is converted to a relatively large rotation. As it is necessary to damp critically the motions of the spring, a vane *e* is attached to its free end and this moves in, but does not touch, the oil-filled dashpot *f*.

Because of the high natural frequency required in the spring for accurate recording the mass and friction of the recording parts must be a minimum. Optical methods are the only ones that fulfill the requirements. In this instrument light starts at *g*, passes through the lens *h*, is reflected from the mirror *d* and, passing through the same lens a second time, is focused on the film *i*. Thus a slight rotation of the mirror *d* causes the image to move across the film. A vertical slit *j* is placed in front of the film to limit the width of the image. The magnification obtained can be varied by changing the relative position of the stylus and the mirror staff, but a multiplication of 200 times ordinarily is used.

Enough Film for Half-hour Test

The film is driven at a constant speed of 7 in. per min., which is found most satisfactory for automobile work. The motor *k* is specially constructed for slow and constant speed. The film is stored and taken up on the spools *l*.

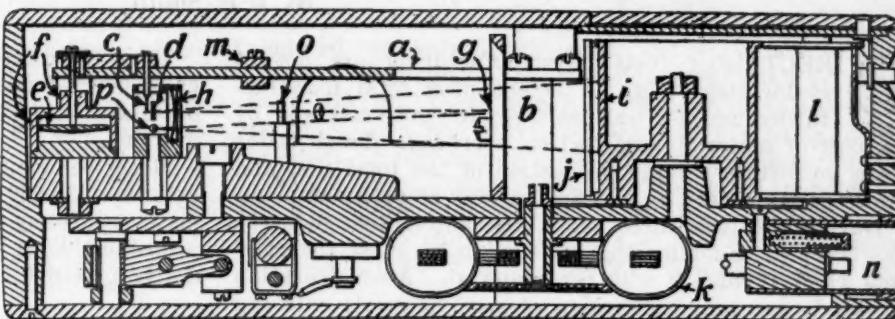
Enough film is available for a record of one-half hour.

The sensitivity of the instrument can be varied by sliding the sensitivity weight *m* along the spring. The battery is connected to the instrument through the bayonet plug *n*. To locate any particular event on the film, the light *o* is provided and is connected to a button so that a vertical line can be made on the film at any desired point. The zero mirror *p* is used to place a fixed line on the film for reference.

Instrument Is Very Compact

The complete instrument is so compact that it can be carried in the coat pocket.

With proper care, however, the readings should be good to 0.05 times the acceleration of gravity, up to a frequency



Sectional diagram of instrument designed by F. H. Norton for measuring and recording vertical accelerations and especially suited for use in research work on the riding qualities of automobiles

of 30 vibrations per sec.

Other forms of instrument have been developed from time to time, but that developed by Mr. Norton is the most compact that has come to our notice. If, as we understand, it is dependable, accurate and easily operated, it should be of considerable assistance to those making a study of riding qualities, once it is learned how to interpret the diagram secured in terms of riding quality.

It is at once evident from the foregoing survey that the problems involved in measuring and comparing riding qualities are decidedly complex. For this reason the design of most parts which control riding comfort has not been carried forward on so rational a basis as has that of many other parts which enter into car construction.

If the proposed research work turns out as satisfactorily as is hoped, it should go a long way toward elimination of cut and try methods and result ultimately in greatly improved riding qualities.

This, together with the development of low pressure tires, which are known to be a most promising step toward riding comfort, is apt to result in a new standard of car performance in this important respect.

Exporters May Have Lists by Request

LISTS, containing the names of importers and agents of automotive products in foreign countries, may be had upon application to any district or cooperative office of the Bureau of Foreign and Domestic Commerce or from the Washington office.

In addition to the periodical compilation of trade lists for all branches of American industry, there are on file definite and complete sales data of a more or less confidential character on more than 100,000 foreign corporations, firms and individuals with which American firms do business. More than 1000 American trade representatives cooperate with the division in keeping these data up to date.

Care in Buying Grows as Raw Material Consumption Reaches Huge Total

Automobile builders now use a large share of output of allied industries. Amount of products consumed so large as to make possible big economies in purchasing.

By J. E. Smith

DIRECT labor costs in manufacturing are not of major importance in determining total manufacturing expense because they are overshadowed by the cost of materials and factory overhead. These latter items constitute a large proportion of the total cost and influence more directly the fluctuations of profit or price.

During the past three years, the automotive industry has occupied a dominating position in many of the markets which furnish it with raw materials. A consideration of the figures on consumption of raw materials entering into the fabrication of automotive units indicates in part why automotive manufacturers are devoting serious attention to the question of careful buying and properly organized purchasing departments.

Market fluctuations, variations in price and diversity of sources of supply are a few of the subjects which are being studied carefully by executives. The consumption figures bear excellent witness to the fact that the importance attached to scientific purchasing is not too great.

These figures bring to light another fact equally important. When it is realized, for instance, that 69 per cent of the total 1923 leather output was consumed by the automotive industry and that this industry also used in the manufacture of cars and trucks 53 per cent of the total plate glass output of the United States, 11 per cent of the finished iron and steel and 9.3 per cent of the finished copper, the necessity for a close study of the automotive industry by the executives of contributory industries is at once apparent.

The stability of these contributory industries in a large measure rests upon the satisfactory progress of the automotive business.

These few facts are proof of the statement that the prosperity of the automotive industry gages to a greater or lesser extent the profits of various contributory industries.

Motor vehicle production in 1923 amounted to 3,636,000 cars and 376,000 trucks. While it is yet too early to estimate accurately what the 1924 output will be, it seems probable that it will be in the neighborhood of 3,800,000 units, 3,400,000 cars and 400,000 trucks.

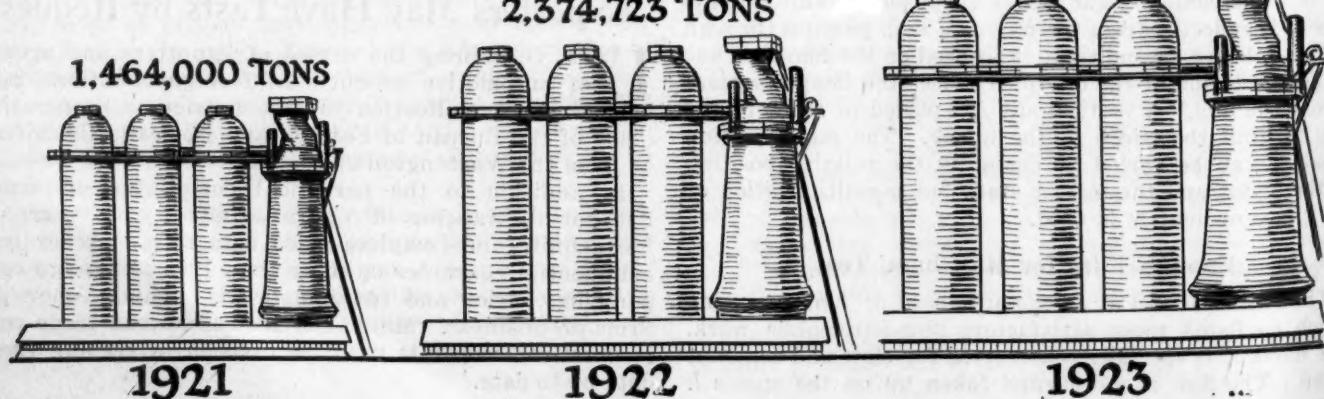
Iron and Steel

Steel to the extent of 3,470,000 tons were required last year for the building of motor vehicles. This amounted to approximately 11 per cent of the total output of the steel industry and represented an increase of almost 1,000,000 tons over the 1922 consumption and of over 2,000,000 tons over the 1921 consumption.

In estimating steel consumption by the automotive industry, it must be remembered that the figures available cover merely the requirements for manufacturing new cars and trucks. If the steel tonnage going to the manufacturers building accessories and replacement parts as well as other mechanical requirements used in the automotive industry and the tonnage used by makers of such products as nuts, bolts, screws, etc., were considered, the automotive total for 1923 probably would be somewhere between 4,250,000 and 4,500,000 tons.

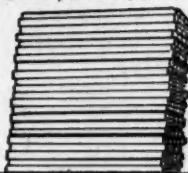
Careful estimates of the value of automotive steel consumption for 1923 placed this figure at \$300,038,000, which was 16 per cent of the total value of all steel produced last year. The influence of alloy steels and of the higher grade steel products used by the automotive in-

AUTOMOTIVE CONSUMPTION OF IRON & STEEL



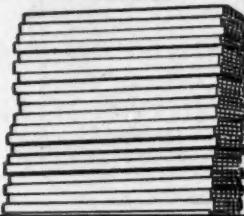
AUTOMOTIVE CONSUMPTION OF LUMBER

313,800,000 BD.FT.



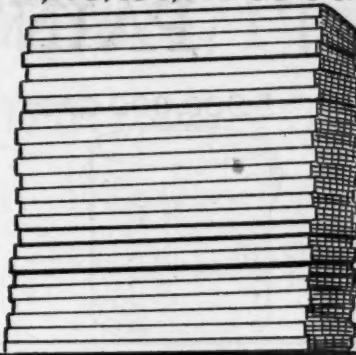
1921

468,074,640 BD.FT.



1922

1,163,232,000 BD.FT.



1923

dustry is indicated in value figures. On the basis of an approximate production of 3,800,000 units for 1924, there probably will be used in the neighborhood of 3,272,000 tons of iron and steel in the manufacture of new cars and trucks.

The National Automobile Chamber of Commerce estimates the 1923 consumption of copper in the manufacture of cars and trucks at 121,949,150 lb., a gain of almost 17,000,000 lb. over 1922 and of over 38,500,000 lb. over 1921.

The Copper and Brass Research Association estimates the total amount of copper used in automotive manufacturing last year as at least 170,000,000 lb., and states in its comprehensive analysis that a "consumption of 200,000,000 lb. of this metal for 1924 is no longer a remote possibility."

Aluminum

Aluminum consumption in 1923 increased 25.8 per cent over 1922 and 111.5 per cent over 1921, amounting to 91,514,000 lb., as compared with 72,706,900 lb. in 1922 and 43,250,000 lb. in 1921. That automotive manufacturers are continuing to use steadily increasing tonnage of this metal is evidenced by the fact that consumption over a period of two years' time has more than doubled.

Estimates for 1924 consumption in the manufacture of cars and trucks places the figure at approximately 87,000,000 lb.

Effect of Increased Closed Car Output

The large closed car output of 1923 has a particularly noticeable effect on the quantities used of upholstery cloth, lumber, glass and paints and varnishes. There was a large increase in the consumption of all of these materials over 1922. In 1922 there were produced 649,000 closed cars, as against 1,185,000 last year. The effect of this 546,000 car increase upon the consumption of the previously mentioned materials is strikingly brought out by the figures for three years.

Upholstery Cloth

The amount of upholstery cloth used has almost doubled yearly since 1921. In that year there were used 5,357,000 yd. In 1922 there were used 10,425,435 yd., an increase of 94.6 per cent over the previous year. In 1923 consumption jumped to 19,036,000 yd., a gain of 82.6 per cent over 1922.

Indications point to a closed car output of approximately 1,326,000 units during 1924, which will require for standard equipment purposes about 21,000,000 yards.

Glass

The automotive industry took more than 53 per cent of the plate glass output of the United States last year. This

compared with 36 per cent in 1922 and 30 per cent in 1921. The 1923 consumption was more than 20,000,000 ft. in excess of the 1922 consumption, an increase of 75.5 per cent and more than 30,729,500 ft. in excess of the 1921 consumption, an increase of 186.2 per cent over that year.

Taking into consideration the probable increase of closed car output for 1924, it seems likely that this year's standard equipment requirements on this item will be between 48,000,000 sq. ft. and 50,000,000 sq. ft.

Lumber

The large increase in closed car output last year caused a skyrocketing in consumption of lumber, which was over twice as great in 1923 as in 1922 and more than three and one-half times as large as the 1921 footage. Hard wood used last year amounted to 1,163,232,000 board ft. This was 14 per cent of the total production of hardwood lumber in the United States. Softwood lumber consumption, including crating for railroad shipments and exports, would add another 300,121,000 board ft.

If the footage of such softwoods as Southern pine, Douglas fir and spruce used in the construction of floor boards, seat frames, spring boards and running boards were taken into account, the 1923 consumption figure, which covers only hardwoods used, would be increased materially.

Paints and Varnishes

Fourteen million, three hundred and four thousand, five hundred gallons of paints and varnishes were used last year, as compared with 7,597,235 gal. in 1922 and 5,900,000 gal. in 1921. Nineteen hundred and twenty-three consumption represented an increase of 88.2 per cent over 1922 and approximately 142.4 per cent over 1921. All factors considered, it does not seem likely that the standard equipment requirements for paints and varnishes for 1924 will fall below those of last year.

Leather and Imitation Leather

Imitation leather consumption has increased at a greater rate than upholstery leather. Imitation leather consumption in 1923 reached 166,319,000 sq. ft., an increase of 45,501,000 sq. ft., or 37.6 per cent over 1922 and of 77,919,000 sq. ft., or 88.1 per cent, over 1921. Contrasted to this is the consumption of leather upholstery, which amounted to 60,000,000 sq. ft. in 1923, an increase of over 32.5 per cent, or 14,740,000 sq. ft. over 1922 and 61.4 per cent, or 22,835,000 sq. ft., over 1921. Volume production on low-priced cars accounts in a large measure for the greater rate of increase in the consumption of imitation leather. Bureau of Census figures show the production of various kinds of upholstery leather for 1921, 1922 and 1923 as follows:

AUTOMOTIVE CONSUMPTION OF PAINT & VARNISH

5,900,000 GAL.



1921

7,597,235 GAL.



1922

14,304,500 GAL.



1923

	1923	1922	1921
	Hides	Hides	Hides
Total	1,972,863	1,898,183	1,089,837
Whole-hide grains	490,276	492,688	288,109
Machine buffed	253,044	223,594	125,395
Whole-hide splits	1,229,543	1,181,901	676,333

There are no accurate figures as to the percentage of whole-hide grains, machine buffed grains or whole-hide splits going to the automotive industry, but an estimate has been made by reliable authorities which shows that of the whole-hide grains and machine buffed grains approximately 95 per cent went to the automotive industry. Since splits are shown under one head in the figures of the Bureau of Census, it is necessary arbitrarily to call 60 per cent of the total main splits and the remaining 40 per cent second splits. Of the main splits, approximately 90 per cent went to automotive manufacturers and of the second splits approximately 10 per cent. These figures are interesting as showing the character of the hides used by automotive manufacturers.

Lead

Figures for lead are misleading, in that the data for 1921 and 1922 do not take into account the amount of lead used in the manufacture of storage batteries. The 1923 figure of 60,085 tons, representing 12 per cent of the lead output, includes the metal used by storage battery makers.

Nickel and Tin

Figures for nickel and tin show an increase in tin consumption of 85.2 per cent in 1923 over 1922 and a decrease of 20.4 per cent in the amount of nickel consumed.

Top and Side Curtain Material

Top and side curtain material consumption for 1923 was practically double that of 1921 and 34.7 per cent more than that of 1922. Forty million, eight hundred and seventy thousands pounds of hair and padding were used last year, as compared with 34,832,753 lb. in 1922 and 16,000,000 lb. in 1921. The 1923 consumption represented an increase of 6,037,247 lb. or 17.3 per cent over 1922 and 24,870,000 lb. or 155.4 per cent over 1921.

Difficulty of Securing Accurate Statistics

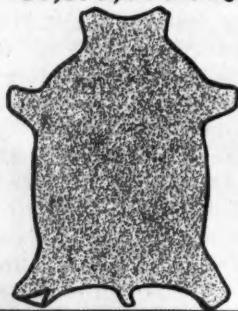
The ramifications of the automotive industry are so varied that it is an exceedingly difficult task to secure consumption figures which accurately reflect the true importance in the raw materials market. It has been pointed out previously that there exists an obvious difficulty in the matter of securing adequate steel statistics. For instance, no credit is given to the automotive industry as a consuming factor in the structural steel market, in the machine tool market, or in the contributory industries such as the replacement parts and accessory business.

If accurate figures could be obtained showing the actual consumption of raw materials by the automotive industry in its various branches, the data which are available would have to be increased considerably in order to take into account the additional amounts which are not now credited to it.

Incomplete as the information available is, it nevertheless indicates the importance of the automotive industry to the contributory industries and visualizes for the automotive manufacturer the possibilities for economies in purchasing these huge quantities of raw materials.

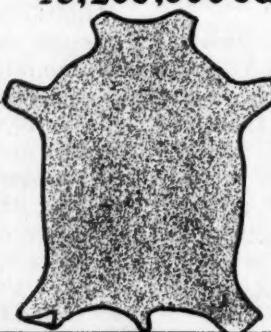
AUTOMOTIVE CONSUMPTION OF LEATHER-UPHOLSTERY 60,000,000 SQ.FT.

37,165,000 SQ.FT.

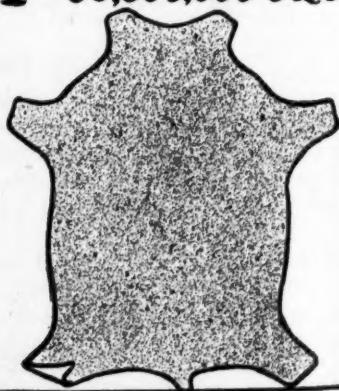


1921

45,260,000 SQ.FT.



1922



1923

Gear Manufacturer Has Definite Place in Production Scheme

Performs an essential service, says speaker at American Gear Manufacturers' Association convention. Accurate cost keeping urged. Progress in standards work.

By P. M. Heldt

THE legitimacy of the gear cutting business, its right to existence as a specialized branch of our industrial organization, formed one of the most interesting topics of discussion at the eighth annual meeting of the American Gear Manufacturers' Association held at the Lafayette Hotel, Buffalo, April 28-30.

The need for accurate cost keeping methods also was emphasized, while the reasons were sought for wide differences in figuring quotations on the same job. Recent developments in standardization work were outlined and several new standards were adopted. Considerable discussion followed the report of the Tooth Form committee and resulted in the adoption as recommended practice of a new standard for stub teeth.

Factory visits during the convention enabled members of the association to see application of a new method of making bronze castings and a number of gear planers for manufacture of herringbone gears which involve some novel construction features.

Debate on the economic status of the gear manufacturer came about in connection with the paper by L. G. Hewins, sales manager, Van Dorn & Dutton Co., on "The Gear Manufacturer Needed." The point was made that specialized businesses are likely to thrive in times of industrial boom. When orders come in faster than they can be taken care of in the plant, it is the most natural thing for the machinery manufacturer to let out some portion of the work, particularly such as require special, expensive machinery, specially skilled labor, or both. At such times the specialized industries act as a sort of shock absorber. On the other hand, when the volume of business is contracting and a certain amount of his floor space is idle, the machinery manufacturer begins to wonder whether it is good policy on his part to "pay a profit to the other fellow" when he might earn it himself.

Mr. Hewins said in part:

Three Classes of Gear Users

"What position does the gear manufacturer occupy today in the broad field of industry? What great manufacturing service is he rendering that warrants a continuance of his business?

"Let us start with a brief analysis of our market, which can be properly divided into three classes of gear users:

"1. The man who requires a few gears occasionally, either for replacement or experimental work.

"2. Those firms using somewhat larger quantities of gears in connection with equipment they produce or operate.

"3. Manufacturers who use large quantities of the same kind of gears—day in and day out.

"Referring to the first class, we all probably have had

experience with the fellow who comes into the office all out of breath, sometimes with a greasy gear in his hand, who wants us to stop everything else to set up machines for a few parts he urgently needs.

"We often do pitch in to help him out, but possibly if we knew and dared to charge what it actually *costs* us to put through these few gears special for him we would have to take the rest of his machine in part payment.

"Our friends, the automobile manufacturers, have been quick to realize this situation and, due to their vision of service, it is possible to get replacement gears promptly and at much lower cost than if only a few parts were run through at one set-up. This is both a far-sighted and a 'fore-sighted' policy that could be followed to advantage by manufacturers in many other lines, who use gears in their products.

The Principal Market

"Passing over to the third class, we have the Henry Fords of industry, who are in position to control their production so that they can install more highly specialized equipment than we gear men would be justified in doing—not knowing how long we might have the business. These manufacturers possibly have a stabilized design, with practically no changes in production which would make it necessary to discard considerable expensive equipment. With these few we have little argument.

"Let us now consider the second class of gear users—that large group of manufacturers making equipment requiring gears in various quantities, some of whom are attempting to produce their own gears, with varying success. This group requires many different types of gears, which in turn are supplied by as many different classes of gear manufacturers. Most gear manufacturers specialize in one or two classes of work, but only a limited number have facilities covering a wide range of production.

"Economically, we should confine our activities to the work for which we are best fitted, from the standpoint of equipment and experience.

"Some manufacturers in this second group have had their own gear equipment from the beginning, while others have possibly been encouraged to install gear cutting machinery on account of what they considered slow delivery, high price, or some other form of poor service on the part of gear manufacturers.

"Although it can usually be shown that, economically, these manufacturers were not justified in the addition of a gear department, they have done it, and some of the responsibility can be laid at the gear manufacturer's door. With a little more vision, we might have satisfied these customers, have saved them money and, incidentally, increased our own business.

"The fact is that in most of these cases the manufac-

turer can purchase better gears at lower prices from one of the reputable gear manufacturers. The humor of this situation is that some of the makers of gear cutting machinery find it desirable to purchase gears for their machines from the gear manufacturers."

Pitfalls in "Home" Gear Production

Mr. Hewins gave eight reasons why the machinery manufacturer of the class referred to often sustains a loss when attempting to cut his own gears. These points may be briefly summarized as follows:—

- 1—Often he cannot get the same quality of work.
- 2—His gear equipment is likely to be idle a large part of the time, in which case it will increase his overhead expense.
- 3—If there is not enough work to keep the department busy the year around there is a tendency for the workers to slow down to make their jobs last.
- 4—In order to have the gears in time, with limited equipment, it is sometimes necessary to start on them months in advance, which means slow turnover of material and labor investment.
- 5—It is much more difficult to take care of peak loads than where the gears are obtained from specialists.
- 6—When gear machinery is used only part of the time it becomes obsolete before it is worn out, and the continued use of such machinery means increased cost.
- 7—Sometimes a manufacturer requires both ordinary and heat-treated gears in the same machine, and if he has no heat-treating equipment he is tempted to use untreated gears all around, thus lowering the quality of the machine.
- 8—Capital which would have to be tied up in gear machinery could often be used to much better advantage in developing the sales of the firm.

Continuing, Mr. Hewins said:

"We should be interested not only in selling gears, but also in giving our customers the advantage of all we have learned about design, material, heat treatments, etc. Our aim should be to supply the gears most suitable for each particular application."

Giving Technical Advice

"Many times we feel that the needs of the customer might be quite different from the specifications submitted to us and considerable tact is required on such occasions in making our recommendations, because it isn't uncommon to encounter an engineer who isn't convinced we can show him anything about his gear installation. He's something like the graduates of a well known Eastern college, of whom they say 'You can tell them, but you can't tell them much.'"

Mr. Hewins here explained that it is the practice of his company to get very complete data of the job for which the gears are intended, and this often enables them to make helpful suggestions. In one particular instance they suggested using a finer pitch and a narrower face, which enabled them to make the gears on their automotive equipment, thus saving their customer considerable money.

A classification of the different gear shops was made next and Mr. Hewins went on: "Economically, we should, so far as possible, confine our efforts to the work we are especially equipped for, regardless of how badly we may need business. Dan Patch made a wonderful record of 1.55 as a pacer, but he wouldn't show up particularly well in a race with Zev, last season's champion runner."

"The average machinery manufacturer has so many other things to think about that we can't reasonably expect him to know everything about gears. He's something like the proprietor of the general country store on whom the cub salesman was sent to call. The young fellow breezily entered the store, holding up three fingers of

his right hand. 'Mr. Jones,' he said, 'you have just three problems.' 'Three nothing—I have three thousand.'"

The concluding portion of Mr. Hewins' paper was devoted to emphasizing the importance of planning sufficiently far in advance, the annoyances and losses which result if orders are delayed till the last moment being illustrated by an actual example.

One of the grievances of the gear industry, it was brought out in the discussion, is that customers often ask the gear makers to prepare estimates and do a lot of preliminary engineering work and then in the end decide to do the work themselves. A specific example was mentioned where a big corporation asked fourteen firms for bids on a rather involved contract. The member who related this experience said it cost his firm \$350 to prepare the bid, and the cost to the other bidders was probably about the same. The bids ranged all the way from \$18,000 to \$38,000, including two bids by subsidiaries of the corporation of \$22,000 and \$23,000. The subsidiary making the latter bid got the business.

One member thought that such abuses might be checked by leaving out some essential details in the drawings. Another, who besides making gears also makes gear cutting machinery, said that when it came to asking for free engineering service the gear makers themselves were not a bit backward.

Committee Reports

The convention was opened on Monday afternoon with a short address by the president, George L. Markland, Jr. The rest of this first session was devoted chiefly to committee reports.

Chairman B. F. Waterman of the General Standardization Committee gave an outline of the work in hand by the various sub-committees. He also reported for the Sectional Committee on Gears of the American Engineering Standards Committee, and in this connection mentioned the opportunities offered the committee. He said the A. G. M. A. should be the chief sponsor for gear standards and the sub-committees should be composed of men who are the leading authorities in their respective fields.

On Feb. 8 the chairman, vice-chairman and secretary, constituting the Executive Committee of the A. E. S. C. Sectional Committee on Gears, met in New York and appointed the following sub-committees: Program, Editorial, Nomenclature, Tooth Form and Spur Gears, Helical Gears, Worm Gears, Bevel Gears, Materials, Inspection, Horsepower. A standard procedure for committee meetings and an order of business for the meetings of the Sectional Committee were formulated and adopted.

Loose Leaf Gear Handbook Planned

New plans for a handbook on gears have been worked out by the Library Committee. This is to take the form of a loose leaf volume, to contain both the standards sheets the association will issue from time to time and other material on gears which may be collected by members of the Library Committee or contributed by others. A number of sample data sheets, 5½ by 8½ in. in size, were distributed and met with general approval.

The Library Committee is also conducting negotiations with the publishers of the Engineering Index with a view to making arrangements for circulating among the membership that part of the monthly index which relates to gears.

A. F. Cooke, as chairman of the Herringbone Gear Committee, presented a report containing proposed dimensions for herringbone gears cut with a single thread hob. The proportions are uniform with those for herringbone gears cut by other processes except for the dimensions of the groove at the middle of the gear. Considerable objection

developed to this proposal. It was argued that standardization aimed to reduce the number of different proportions and methods and that the proposal made tended rather in the other direction. After extended discussion it was decided to refer the report back to the committee for further consideration.

F. E. Eberhardt made a report for the Nomenclature Committee. Definitions of the fundamental terms used in the gear industry have been approved not only by the sub-committee but also by the Sectional Committee, and it now remains only to formulate additional definitions relative to helical, herringbone and worm gears and racks, in conformity with the adopted definitions, to complete the work.

Cost Accounting Problems

During the evening session on Monday Russell C. Ball of the Philadelphia Gear Works read a paper on "What Have I Left Out; or, The Value of Cost Accounting to an Executive." Mr. Ball said:

"The possibility of error in quoting is not due altogether to lack of cost knowledge, but to that element of human nature which makes mistakes possible and only too frequent. The average purchasing agent who sends out from six to ten inquiries knows the chances are that one of the bidders will make a mistake and quote low, and someone usually does.

"The estimator, as a rule, figures with the thought that he wants the job and usually with favorable conditions in mind."

Mr. Ball deprecated the practice of some firms of asking for an opportunity to refigure if they should be high and of the custom of soliciting requests for quotations, intimating that they do work much cheaper than others, stating that it would be much better to advertise service and quality. He then continued:

"Gear prices do not appear to have advanced in proportion to the increased cost of gear cutting machinery or the increased cost of production. The average gear plant of today is not only making gears, but also is furnishing engineering information and blue prints with estimates. This tends to increase the overhead which cannot be charged to any particular job, as in a great many cases the engineering work is done on inquiries for which an order is not received.

Effect of Increased Machinery Cost

"Competition, especially in small and medium size work, has forced gear manufacturers to secure more modern and heavier machinery and, while the production from these machines may be greater, the gear purchaser usually gets the benefit. For this reason, it is questionable whether the manufacturer is getting a reasonable return for his investment. Most of our present day production is coming from machinery which has been in service probably from five to ten years and which was purchased at considerably lower prices than are prevailing today; and, while no doubt they have depreciated, their value also has increased in proportion to the increased cost of replacement.

"I believe that in setting a price on each machine a group of gear cutters of a certain size should be taken as a whole, using the replacement values, amount of floor space and power consumed as a basis and making the price on each machine in the group the same. While this may not be true cost accounting, it would be of value to the estimator who, when he is bidding on a job, does not generally know which machine will be available at the time the order is received; and it would also assure a sufficient return to make replacement possible."

In the discussion of this paper F. W. Sinram said that

certain gear manufacturers are hit by the cost of new machines because they are compelled to compete with firms doing their work on machines bought five or six years ago at much lower prices. In this connection mention was made of the custom of a printer to deposit his money with a building and loan association in order to have the necessary capital available when it became necessary to purchase a new press. Mr. Ball said that if gear makers have a machine for which they cannot get work if they allot to it its full proportion of the overhead they will often neglect the overhead to keep that machine working. Everybody having a similar machine will suffer under this practice.

W. E. Sykes of the Farrell Foundry & Machine Co. read a paper on "Gear Practice in England." Mr. Sykes said in part:

"Although machine cut gears had been made in Great Britain for about eighty years, their manufacture could not be distinguished as a specialized industry until the beginning of the present century, when one or two manufacturers began to devote all their energies to the production of cut gears.

"The extensive use of high speed electric motors, the development of the automobile and later the demand for a speed reducer in connection with steam turbines, opened up new fields for the gear specialist. But the whole field became so large that only one firm has been able to expand its resources sufficiently rapidly to cover it all. All others have either confined their efforts to a general class of gearing of small or medium sizes, and for low speed work, or have specialized in one type of gear, or have limited their activities to a small range of sizes.

Organization of British Gear Industry

"There are specialists in bevel gears, specialists in worm gears, specialists in automobile gears, in rawhide gears, in herringbone gears and in helical gears—but only one which manufactures all types and all sizes, with the possible exception of smallest watch and clock gears.

"Standardization has made little progress. The British Engineering Standards Association has formed a committee, but only one meeting in three years is recalled. It is generally believed that development is at present so intensive that standardization is inadvisable."

The Bevel and Spiral Bevel Gear Committee, of which F. E. McMullen is chairman, presented tables of tooth elements of spiral bevel gears for 1 diametral pitch for a wide range of combinations in accordance with the Gleason system of tooth design which was adopted as Recommended Practice by the association in October, 1922.

These tables contain all angles, diameters and dimensions necessary for gear design on the basis of 1 diametral pitch, and linear dimensions for other pitches are readily obtained by dividing the tabular values by the desired pitch. No attempt was made to cover the spiral angle, which must be selected to suit the pitch and length of face. One table is given for each combination, and as all combinations from 10 and 25 teeth to 30 and 100 teeth are covered, the tables are very numerous. They are contained in a book published by the Gleason Works.

Further Study of Non-Metallic Materials

C. R. Weiss, chairman of the Sprocket Committee, said his committee had nothing to report. There was only one subject left with which it had to deal, namely, horsepower ratings, and that required considerable time to work out.

F. G. Sorensen, reporting for the Non-Metallic Gearing Committee, said that this committee has been doing considerable test work on all of the phenol condensation prod-

ucts adapted for gearing which are now on the market. An oral report on these tests was made at the meeting at Lake Mohonk last fall. The results now have been published in pamphlet form, the names of the different products being withheld.

Tests were made on six different materials, bearing on resistance to impact, compression strength, transverse strength, deflection and resistance to tensile split. The results obtained from all of the materials were arranged in tabular form, both the actual values and the relative values on the basis of the maximum value obtained in any particular test being made 100 per cent. The percentages for any given material for all of the different tests were then added up and the largest sum thus obtained was made equal to 100 per cent, the other materials being rated accordingly.

Classifying Phenol Condensation Products

In this final classification four of the materials were rated at over 90 per cent, while one was 83.95 and another 73.44. It had been hoped originally that the results from all of the materials would fall within the limits of 90 and 100 per cent, and the rather poor showing of two of them seemed to make the original plan of establishing a maximum permissible working stress applicable to all phenol condensation products rather impracticable.

Tables also were compiled showing the average result from all materials in each different test, reduced to the nearest lower round figure, both parallel and perpendicular to the sheet, and the maximum, minimum and average value in each test from each material. These tables were sent to the manufacturers of the different materials, without informing them, however, which of the results applied to their own materials. It is understood that some of these manufacturers now are endeavoring to bring their materials up to the general average in quality. Tests also have been begun on the materials in an endurance testing machine. This report was accepted as a progress report.

On Tuesday morning a change in the constitution was voted whereby the annual meeting of the association will hereafter be held during April or May instead of during March or April.

S. O. White, chairman of the Differential Committee, made a progress report which was largely in the nature of a complaint of lack of cooperation. He said his committee had worked out designs for two sizes of four pinion differential, which were submitted to the membership for approval by mail, and on the theory that silence indicated consent, these designs met with the unanimous approval of the association.

Proposed Standard Differentials

The experience of the S. A. E. in the same matter had been rather different. They submitted the same designs to 106 manufacturers, replies being received from 60 per cent. Most of them approved the designs submitted but others suggested minor changes, and this necessitated changes in the drawings and recirculation of the latter. During the first part of April the secretary of the association sent out drawings of a proposed standard two-pinion differential which uses the same side gears as the four-pinion differentials of earlier design. The report was accepted.

C. B. Hamilton, Jr., presented the report of the Metallurgical Committee. At the fall meeting in 1923 a general specification for steel castings was proposed, but as the recommendation had not been before the members for the required 30 days it could not be adopted as a recommended practice. Provision was made for three grades of steel gears, case-hardened, untreated and treated. To meet

these three requirements two grades of steel castings were specified, as follows:

For case-hardened gears, a steel of 0.15-0.25 per cent carbon.

For untreated gears, a steel of 0.30-0.40 per cent carbon.

For treated gears, the same steel, of 0.30-0.40 per cent carbon.

Cast Steel Specifications

The phosphorus and sulphur limits of the A. S. T. M. Class B castings were recommended for every case, these being as follows: Acid process, phosphorus not over 0.06 per cent; basic process, phosphorus not over 0.05 per cent; both processes, sulphur not over 0.06 per cent. The manganese limits recommended for all of the steels are the same as in the S. A. E. low carbon forging steels, namely, 0.30-0.60 per cent. This specification replaced that adopted in 1921, but kept in force the annealing specification of 1922.

The committee stated that in submitting this specification it had considered that with the manganese limited to 0.60 per cent a water quench could safely be used for treating gears to obtain the desired physical characteristics, rendering unnecessary the use of steel of special analysis, with higher carbon content, for this purpose. A carbon limit of 0.40 per cent and a cheap quenching medium were considered highly desirable.

Mr. Hamilton informed the members present that the A. S. T. M. planned to standardize the same material but had not progressed as far, and the steel interests were anxious to have the carbon range increased, which proposal he opposed. F. W. Sinram said that the standardization of steel castings was very much needed, not only in the interest of the gear makers but of their customers, and if outside interests should oppose it the association should put up a fight. The report was adopted.

Perhaps the most important work in the way of standardization accomplished at the meeting was the adoption of a new standard for stub teeth. In the report of the Committee on Tooth Form, of which H. J. Eberhardt is chairman, it was stated that there are no less than nine standards or systems of stub teeth in use on this continent and that it was considered one was sufficient. The committee had solicited and received the cooperation of the firms most vitally interested in this subject, including the Fellows Gear Shaper Co. and the R. D. Nuttall Co.

New Stub Tooth Standard

The stub tooth system which has been in most extensive use, at least in the automotive field, is that designated by two pitch numbers, like 6-8, in which all transverse dimensions such as the circular pitch, tooth thickness, etc., are dependent upon the first of the pitch numbers, and all radial dimensions, such as addendum, dedendum and total height, are based on the second of the pitch numbers. This makes the proportion between the depth and thickness of the tooth variable with the pitch. According to the new standard these dimensions will be proportional for all pitches. The proportions adopted, moreover, are uniform with those of the Recommended Practice for herringbone gears. It was stated that the proposed gears will run properly with the Nuttall gears and also with gears cut according to the later Fellows system. In the case of the Nuttall system, the only dimension affected is the clearance. When the proposed gear runs with a Nuttall there will be a clearance of 0.1425 D. P. at the bottom of the tooth spaces of the Nuttall and a clearance of 0.2146 D. P. at the bottom of the tooth spaces of the proposed gear.

According to the new standard both diametral and circular pitches are to be used, diametral pitches up to 1 and circular pitches from 3 in. upward. Since a diametral

pitch of 1 corresponds to a circular pitch of 3.1416 in., this involves a slight overlapping of the two ranges. The pressure angle is 20 deg. Following are the proportions of the various tooth elements in terms of both the diametral and the circular pitch:

Addendum = $0.8/D$. P. in. = 0.2546 C. P. in.
Dedendum = $1/D$. P. in. = 0.3183 C. P. in.
Working Depth = $1.6/D$. P. in. = 0.5092 C. P. in.
Total Depth = $1.8/D$. P. in. = 0.5729 C. P. in.
Pitch Diameter = N/D . P. in. = $0.3183 \times N \times C$. P. in.
Outside Diameter = $(N + 1.6)/D$. P. in. = P . D. +
(2 \times Addendum).

A minimum clearance of 0.21 diametral pitch is recommended for new cutters and gears. After being amended to fix the limits of the diametral pitch and circular pitch ranges, as already mentioned, the stub tooth proposal was adopted as the Recommended Practice of the association.

Proportions for Full Depth Teeth

The report of this same committee also proposed proportions for the chief elements of full depth teeth. It appears that there are eight important dimensions of such gears and practice with respect to six of them is pretty well unified at the present time. Formulas for these six elements were proposed in the report, while a consideration of the other two elements, which were referred to as debatable, was left to the future. The same limits for the diametral pitch and circular pitch ranges were adopted as for the stub tooth system. Following are the proportions suggested and adopted for the six elements in regard to which there exists general agreement:

Addendum = $1/D$. P. in. = 0.3183 \times C. P. in.
Min. Dedendum = $1.157/D$. P. in. = 0.3683 \times C. P. in.
Working Depth = $2/D$. P. in. = 0.6366 \times C. P. in.
Min. Total Depth = $2.157/D$. P. in. = 0.6866 \times C. P. in.
Pitch Diameter = N/D . P. in. = $0.3183 \times N \times C$. P. in.
Outside Diameter = $(N + 2)/D$. P. in. = $0.3183 \times (N + 2) \times C$. P.

The two so-called debatable elements are the basic tooth thickness on the pitch line and the minimum clearance.

Three Basic Tooth Forms

Referring to the work in hand by the Tooth Form Committee, F. E. Eberhard said that it was proposed eventually to standardize on three forms of teeth, one based on a composite rack, partly involute and partly epicycloidal, which will generate the form of tooth produced by rotary cutters and which has a $1\frac{1}{2}$ deg. pressure angle; one based on a straight-sided rack tooth with a $1\frac{1}{2}$ deg. pressure angle and the third based on a straight-sided rack tooth with a 20 deg. pressure angle. There were, however, slight modifications also in these so-called straight-sided rack teeth.

L. G. Nilson presented a report on dimensions of keyways and keystocks. A committee of the A. S. M. E. is working on the same subject and, while there have been conferences between the two committees, they have been unable to agree on all details. The A. G. M. A. committee recommends square keys for shaft diameters up to 4 in. and rectangular keys for larger shafts, whereas the A. S. M. E. committee recommends both a square and a rectangular key for each shaft size from the smallest up. Tolerances for keyways and keystocks were also given. The recommendations made are contained in the two tables herewith, except that from the table on key sizes several columns have been omitted which gave special sizes of keys to be used where conditions made it impossible to use the standard keys.

It will be noticed that on the keyways there is a positive tolerance in each case and on the keystone a negative tolerance; hence the keyway will practically always be

larger than the nominal size and the key itself smaller. B. J. Waterman of the Brown & Sharpe Mfg. Co. said that in his estimation this was entirely wrong, as the key would always be loose in the keyway and would be what he would call a sloppy fit. In the plant of his firm they always made the keys larger than the keyway and then fitted them by hand. If one of their workmen should get hold of a key of the proposed dimensions he would probably throw it away as junk.

This criticism brought from Mr. Nilson the statement that the proposed keys were intended for general industrial work where the drive is in one direction only. The committee recognized and did not plan to do away with the S. A. E. system of keying, the Woodruff system and the Pratt & Whitney system, but it was felt that for general work there was need for a key that was an easy fit in the keyway. It was explained that if a man had to replace a key in a crane high up in the air he would want one that dropped right into place, whereas in machine tool and similar precision work it might be necessary to secure a better fit by starting with a key larger than the keyway and accurately fitting it by hand.

Frank Burgess of the Boston Gear Works thought that a single key never did make a good job and he favored two or more keys. Mr. Zimmerman of Gould & Eberhardt said it should be plainly stated on the table of keyway and keystone dimensions that these dimensions were for general industrial applications only. As regards Mr. Burgess' proposal to use multiple keys, splined shafts were coming into use quite rapidly.

Discussion on Keys and Keyways

The desirability of a single standard for keys and keyways was fully recognized, but the meeting expressed its approval of the work done by its committee and decided to stand behind the latter, whose recommendations it considered preferable to those of the A. S. M. E. committee. The latter, it is understood, is considering the elimination of both $5/16$ and $7/16$ in. keys, and it was asserted that the elimination of these two sizes and their replacement in some cases by keys of larger size would result in inordinate weakening of the shafts.

Upon the recommendation of B. F. Waterman it was decided to work with the A. S. M. E. committee until they take definite action, urging the advantages of the A. G. M. A. recommendations, and then to see whether the gear industry can use the dimensions adopted.

At this session of the meeting four members of the Executive Committee were elected for a period of three years. Eight candidates had been nominated by the Nominating Committee, of which the following four were elected: F. W. Sinram, Van Dorn-Dutton Co.; H. E. Eber-

DIMENSIONS OF KEYWAYS AND KEY STOCKS [IN INCHES]

DIAMETER OF HOLES OVER NOMINAL INCH	STANDARD		DEPTH OF KEYWAYS The depth of keyways shall be half the thickness of the key measured at the edge according to diagram below
	KEYWAYS KEY STOCK	KEYWAYS KEY STOCK	
$\frac{1}{4}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16} \times \frac{3}{32}$
$\frac{3}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{5}{16}$	$\frac{7}{32}$	$\frac{3}{16}$	$\frac{3}{16} \times \frac{3}{32}$
$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{9}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{11}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{13}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{9}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{11}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{13}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{15}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{17}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{19}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{21}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{23}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{25}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{27}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{29}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{31}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{33}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{35}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{37}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{39}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{41}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{43}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{45}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{47}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{49}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{51}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{53}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{55}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{57}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{59}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{61}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{63}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{65}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{67}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{69}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{71}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{73}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{75}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{77}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{79}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{81}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{83}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{85}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{87}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{89}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{91}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{93}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{95}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{97}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{99}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{101}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{103}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{105}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{107}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{109}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{115}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{117}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{119}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{121}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{123}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{125}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{127}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{129}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{135}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{139}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{143}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{145}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{147}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{149}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{153}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{155}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{159}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{163}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{165}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{167}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{169}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{171}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{173}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{175}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{177}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{179}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
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$\frac{183}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{185}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{187}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{189}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{191}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{193}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{195}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{197}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{16} \times \frac{1}{16}$
$\frac{199}{8}$	$\frac{1}{2}$	$\frac{1}{16}$ </	

hardt, Newark Gear Cutting Machine Co.; A. C. Gleason, Gleason Works, and A. F. Cooke, Fawkus Machine Co.

E. W. Miller made a report for the Gear Research Committee which is raising funds for the construction of the Lewis machine for determining the strength of gear teeth, of which machine a detailed description was presented at a previous meeting of the association. It appeared that a total of about \$2,500 had been pledged by concerns both in and outside the A. G. M. A. up to the time of the meeting, but that a total of \$7,500 will be required to carry through the work. Agreements regarding the production of the patterns and castings have been entered into with Hugo Bilgram of Philadelphia. The tests with the machine will be carried on at the Massachusetts Institute of Technology and the terms of an agreement with that institution were submitted in the report. Professor Miller will have charge of the tests. The machine and specimens for the tests will be furnished by the association, while the M. I. T. will furnish the labor and supervision for the tests free of charge. Both parties to the contract will have the same rights as regards publication of the results obtained.

The Photo-Elastic Test Method

It had been suggested that tests by the photo-elastic method, which is being developed at M. I. T., might give the desired results, but Mr. Miller did not agree with this. The Lewis machine, he said, would permit of determining the strength of the gears under dynamic load, that is, under actual running conditions, and it would not be necessary to draw conclusions regarding the behavior of steel and other metallic materials from results obtained with celluloid.

On Tuesday afternoon some of the members paid a visit to the plant of the Lumen Bearing Co. and that of the Farrell Foundry & Machine Co. The Lumen Bearing Co. has developed a method of making bronze castings for worm wheels by which better wearing qualities are claimed to be obtained.

A chill of cast iron is placed in the mold, surrounding the worm wheel after the latter has been poured. The chilling effect produces a change in the grain structure which was explained to the visitors with the aid of micro-photographs. It is generally recognized that chilling has a beneficial effect, but the Lumen Bearing Co. say they have found that for the best results the chilling effect must be limited. Intense chilling might further improve the tensile properties but would reduce the wearing qualities and they have found that they get the best results from a chill having the same cubic content as the casting itself and one-half as many square inches of surfaces as cubic inches of volume. This concern also makes bronze castings by a centrifugal process, but the machine used for this work was not shown.

New Process for Cutting Herringbone Gears

At the Farrell Foundry & Machine Co. the party saw a number of gear planers for the manufacture of herringbone gears. These machines are the invention of W. E. Sykes, who spoke to the association the previous evening on "Gear Practice in England." The special feature of these machines is that they produce a herringbone gear in a single piece and without a groove at the center. Pinion type cutters are used, similar to that employed with Fellows gear shapers. There are two of these cutters, each cutting one half of the herringbone tooth, the cutters being guided in helical paths by suitable guide surfaces on a hollow shaft. Both the work (which is held on a horizontal arbor) and the cutter rotate at a slow rate, producing a generating action, and the cutter and its

driving mechanism are moved away from the work to give the necessary relief during the return stroke.

Both of the speakers at the annual banquet held Tuesday evening dealt with aspects of the labor problem. James B. Horn, who was introduced as a Russian with a message, spoke of his arrest in Russia in the old Czarist days for the crime of reading revolutionary literature, of his deportation to Siberia and his experience in the Government mines there, where he had to work chained to his wheelbarrow; of his escape to Harbin, China, his trip to England as a stowaway and his final arrival in this country. While in England and during the early part of his stay in this country he preached socialism, but he later saw the fallacies in "socialism, radicalism, anarchism and all other isms" and is now devoting his energies to the enlightenment of the working classes on the advantages of our present industrial system.

S. F. Fannon of the Sherman Service, Inc., spoke on the "Seventy-five Per Cent Dollar in Business." He did not refer to the decreased purchasing power of the dollar as compared with ten years ago, but alleged that owing to a feeling of discontent the production of labor is not more than 75 per cent of what it would be under more favorable circumstances. Setting the loss in production due to this cause arbitrarily at 25 per cent and starting with the value of the goods manufactured in a year, Mr. Fannon arrived at a staggering figure of loss, but he failed to indicate a specific remedy for the condition outlined.

President George L. Markland, Jr., acted as toastmaster. Officers elected by the executive committee for the coming year are George L. Markland, Jr., of the Philadelphia Gear Works, president; E. J. Frost of the Frost Gear & Machine Co., first vice-president; B. F. Waterman of the Brown & Sharpe Mfg. Co., second vice-president, and C. F. Goedke of the William Ganschow Co., treasurer.

Industrial Relations

W. H. Diefendorf, F. W. Sinram and W. G. Fisher were appointed on the Committee on Papers for future meetings. E. S. Sawtelle of the Tool Steel Gear & Pinion Co. as chairman of the Industrial Relations Committee, said he had nothing to report and asked for instructions as to what the Association desired from his committee. In the discussion following Frank Burgess of the Boston Gear Works said that in his estimation the best welfare work was good judgment on the part of the management in compensating men for the work they did. He said there was too much of a tendency to fix the compensation for certain classes of work irrespective of what the man actually accomplished.

Mr. Sawtelle read a paper on "The Management's Responsibility in Industrial Relationship." He said in part:

"Human relationship is not only a business problem but a national problem as well. The fundamental factor in the solution of our industrial relations problem is the practical application of Christianity to our business. Let us not take one bit of the Divine out of Christianity but let us rather realize that because it is Divine it also teaches the fundamental laws and principles for our every-day living.

"No welfare work or even personal contact will atone for an unjustly slim pay envelope. We have learned in our advertising and in our sales propaganda that we must spend money to make money. The wise man years ago said: 'There is that which withholdeth more than is meet but it tendeth to poverty. The liberal soul shall be made fat.' This certainly applies in our dealings with

employees. There is no more excuse for inadequate pay than there is for inadequate work.

"As managers and leaders in industry, we are endeavoring to make dollars. While doing this we can also make men, and the character which we help to breed into our employees and into our business will live long after the net profits for this year are forgotten."

Uses of Spiral Bevels

F. E. McMullen of the Gleason Works talked on "The Application of Spiral Bevel Gears." These gears originally were developed for automobile drives, but at the present time there are forty-seven different applications, Mr. McMullen said. Quoting from the paper:

"There is naturally a great similarity between helical spurs and spiral bevels in that there is the same continuity of pitch line contact, axial thrust and proportionately greater strength, all of which insure quiet and durable operation when properly designed, made and mounted.

"The axial thrust produced by the operation of spiral bevels must be fully taken care of when mounting the gears and failure to do so can only result in poor performance or life of the gear. The importance of this point cannot be overstressed for a strong inflexible mounting insures of almost unlimited life for a well-designed set of case-hardened gears.

"Theoretically, a pair of bevels has no adjustment, which is the term applied to ability to withstand displacement, and while spiral bevel gears cut by the Gleason method possess the adjustment quality, it is a limited quality which must not be abused. In helical spurs any axial separation of a pair of gears merely shortens the lengthwise bearing but does not produce faulty tooth contact.

"There are four distinct qualities which distinguish spiral bevels from straight bevels: Quiet operation at high speeds; smoother action at low speeds; greater proportional strength; cheaper quantity production. The adoption of a spiral bevel gear drive is often determined by one or more of these qualities."

In answer to a question Mr. McMullen said that in about a month it would be possible to obtain machines for cutting spiral bevel gears up to 1½-in. pitch and up to 30-in. blank diameter.

Advertising as an Investment

J. C. McQuiston of the Westinghouse Electric & Mfg. Co. gave a talk on the subject, "Advertising As An Investment for the Gear Manufacturer."

Advertising has been compared to an investment. Two of the important factors in connection with an investment are safety and return, and advertising must be judged from these two points of view. Advertising helps to build up good-will which can be realized on when a business is sold, for instance.

The advertising appropriation should be spent in two fields. Technical and trade publications build up good-will; the industry cannot dispense with them but must support them, as these publications do so much for it. Secondly, each firm must make its direct appeal to possible customers.

Referring to the question as to who should write the advertisements, Mr. McQuiston said that, as a rule, it would not be a good plan for the gear maker to write his own. Of course, he knew gears, but he probably did not know the principles of appeal, and it was the cooperation of the man who knew appeal with the man who knew gears that brought the best results. E. W. Miller suggested that a man be secured who knew both appeal and gears.

In response to a further question Mr. McQuiston said that in good times a firm should advertise to build up good-will, whereas when sales slackened it was good policy to make a more direct sales appeal. He believed in a pretty constant rate of expenditure regardless of business conditions. As to the proper proportion between direct mail and trade paper advertising he said that this depended on conditions, but that 50-50 was a good proportion in the average case.

Stanley P. Rockwell, who is the official metallurgist of the Association, presented a paper on "How to Use the Microscope in the Analysis of Steel." Throughout the period of the convention there was an equipment for taking photographs and micro-photographs of steel sections on exhibition at the meeting rooms, the outfit being placed at the disposal of the Metallurgical Committee by the Bausch & Lomb Mfg. Co., its manufacturers.

Mr. Rockwell said that in determining faults in steel the microscope often is of much greater service than equipment for chemical analysis, as in the majority of cases the fault is not due to incorrect composition but to faulty treatment, which shows up in the grain. A large number of micro-photographs were thrown on the screen and the history of the specimens was detailed.

New Gear Applications

One of the views showed innumerable fine cracks in a hardened steel, and it was explained, in answer to a question, that these cracks extended to a depth of perhaps only a thousandth of an inch; that many people would not call them cracks at all, but in any case they were strain lines.

One of the newest committees of the Association is that on New Gear Applications, of which C. T. Roantree is chairman. Mr. Roantree read a short report in which he said an attempt had been made to survey the whole field of gear application and that these applications could be grouped under four heads as follows: Industrial, public utility, building and general trades and merchandising.

E. A. Kebler, chairman of the Commercial Standardization Committee, said the committee had been biding its time pending developments at Washington affecting the status of trade associations. There was at present in preparation a Code of Ethics defining the proper attitude of the members toward each other and toward their customers. In the discussion on this report figures were given showing the relative activity in the gear business on a percentage basis. For the whole year 1923 the rate of activity had been 75.5 per cent, at present it was 72 per cent and during the next three months it would be 73 per cent, according to estimate. It was stated that a careful survey of business conditions warranted no pessimism.

C. B. Hamilton, Jr., thought that pig-iron production was a better index of industrial activity to be expected during the next few months than were total carload shipments, because the machine shops would be working during coming months on the pig iron produced during past months, whereas the total carload shipments represented to a large extent products which had already passed through the shops.

Gears and Pinions of Equal Strength

The last paper to be read at the meeting was on "Gears and Pinions of Equal Strength," by M. A. Durland, assistant professor of Machine Design at the Kansas State Agricultural College. It describes a general method whereby the strength of a gear and its mating pinion may be equalized without departing from standard cutters and standard center distances. The paper is reproduced herewith in slightly abbreviated form.

"If a standard generating cutter is used in cutting teeth on an oversize blank, long addendum teeth will result, and conversely if an undersized blank is used, short addendum teeth will result.

"If a standard diameter pitch circle is used and teeth generated by setting a standard cutter in and out various distances, a series of teeth will be obtained which vary in strength from the shortest addendum (which is the weakest) to the longest addendum (which is the strongest).

"This is the method by which the curves shown in Fig. 1 were obtained. After a series of teeth with various addendums have been generated for a gear with a certain number of teeth, the Lewis factor for each tooth is determined. Then the curve is plotted, using Lewis factors as abscissae and increase or decrease of addendum as ordinates. The ordinates for all curves sloping upward to the right are increases in addendum. The ordinates for curves sloping upward to the left are decreases in addendum.

"The particular series of curves illustrated are for gears of 20 deg. pressure angle, a working depth equal to two divided by the diametral pitch and a clearance equal to one-sixth the reciprocal of the diametral pitch.

Point of Intersection Shows Addendum Increase

"The point at which any two of these curves cross determines how much the addendum of the pinion must be increased and the corresponding amount by which the dedendum of the gear must be increased in order to make the pinion and gear, indicated by the curves, of equal strength. At the same time the abscissa of this point of intersection gives the Lewis factor for both pinion and gear.

"For example, consider the case of mating a 12-tooth pinion with a 36-tooth gear. Ordinarily, the tooth curves for the 12-tooth pinion would have to be modified somewhat on account of interference, but that will have no effect here. Referring to Fig. 1, the curve for the 12-tooth pinion (sloping upward to the right) crosses the curve for the 36-tooth gear (sloping upward to the left) at a point whose ordinate indicates an increase of 42 per cent in the addendum of the pinion and dedendum of the gear. The corresponding Lewis factor shown on the abscissae is 0.104.

"This pair of gears is illustrated in Fig. 2. The factor shown at the root of a tooth on each gear corresponds to a Lewis factor of 0.102. In Fig. 1, the curve for the 12-tooth pinion does not cross the line for normal ad-

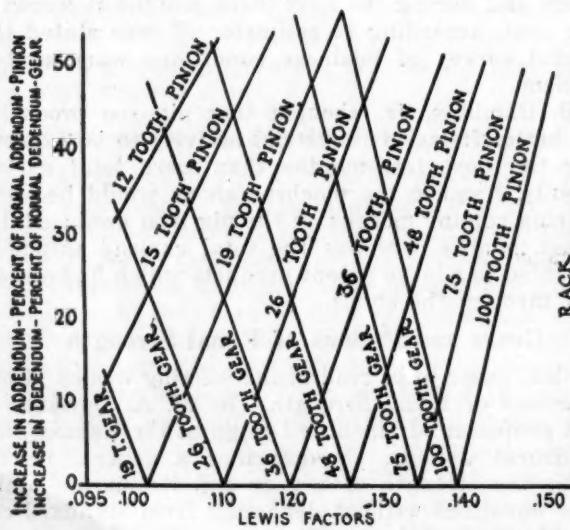


Fig. 1

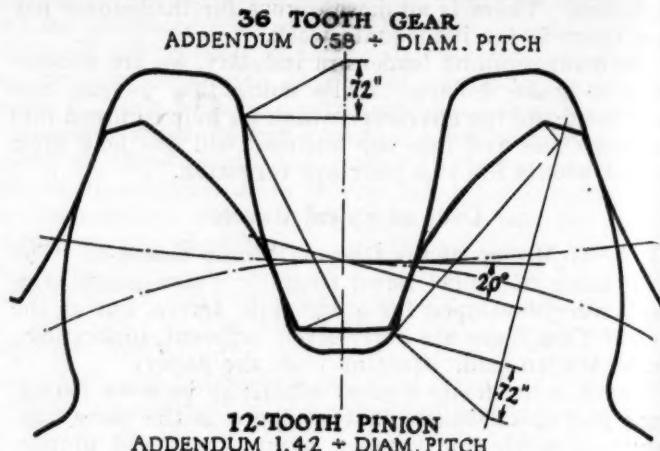


Fig. 2

dendum on account of interference, so it cannot be determined accurately from the chart just how much of an increase has been obtained, but it is probably about 25 per cent. If a 19-tooth pinion were to be used with a 100-tooth gear the increase in strength could be read directly from the abscissae as equal to the difference between 0.1025 and 0.126, or about 23 per cent. With larger gear ratios, using the smaller pinions, the resulting increase is much more striking.

"The width of top land on the pinion teeth may frequently be a limiting factor. To care for this the curves in Fig. 1 might be cut off at their upper end at some predetermined width of top land.

"It is true that considerable labor is involved in making up a complete set of curves such as these might be a part of, but considering the breadth of their application, that would be of little importance. The accuracy of the curves is, of course, entirely dependent on the draftsman, but it is thought that it is not particularly difficult to check points on the curves within limits of plus or minus 1 or 2 per cent. Also, in plotting such a series of curves as these, their known similarity and also the fact that they must approach that of a rack will be of material assistance.

Applied to Pairs of Dissimilar Materials

"The curves shown are drawn as straight lines. It is quite likely, however, that other combinations of pressure angle and working depth will not have a straight line variation between strength and change of addendum. It is probable, though, that in the majority of cases a straight line may be as accurate as the data will justify."

In the concluding paragraph of the paper it was explained that the system might also be applied in cases where the pinion and gear were made of materials of unequal strength, such as steel and cast iron, but that owing to the much greater range in the tensile strength than in the Lewis factors it would be impossible in general to equalize the strength of a steel pinion and a cast iron gear.

It was brought out in discussion that long and short addendum gears are used in the industrial field and that the use of steel pinions is recommended in case the pinion has a small number of teeth, both practices being intended to compensate for the reduction in tooth strength with the number of teeth. The suggestions contained in the paper were referred to the Tooth Form Committee for consideration.

The fall meeting of the Association will be held Oct 16-18, probably at Briarcliff Manor, N. Y.

Here and There in Foreign Markets

(Courtesy Automotive Division, Bureau of Foreign and Domestic Commerce)

Immediate Opportunities in Portugal

ANUUSUAL opportunities for the sale of American cars in Portugal are made possible by the present discriminatory taxes against French goods and vessels, according to Consul General W. S. Hollis at Lisbon. Since November, the cable continues, maximum tariffs multiplied by three have been applied on all French goods imported into Portugal, and the port and other taxes on French vessels entering Portuguese ports have been raised to three times the ordinary maximum tariffs, due to what is called unfriendly discrimination on the part of France against Portuguese wines and sardines. In consequence, importations of French goods have declined almost to the vanishing point and competition of French automobiles has almost disappeared.

"No American manufacturers have, to the writer's knowledge," the cable concludes, "yet attempted to profit by this exceptional opportunity by sending, say, a six months' supply of cars to this country on consignment, or by in any way departing from their fixed policy of selling only for prompt cash either on, or immediately after, delivery."

London May Regulate Street Noise

ANXIOUS to harmonize the bedlam which now prevails in London streets, the British Ministry of Transport is seriously considering a scheme for the standardization of sounds for motor horns, according to William M. Park, Assistant Trade Commissioner at London.

It is proposed that there should be three distinct classes of horns, one for use on trucks, another for passenger cars, and a third for motorcycles. Such an arrangement, it is believed, would simplify the tasks of traffic policemen and reduce the discordant blare of noise from the horns now in use.

Austrian Accessory Market Grows

FIVE leading firms of automotive accessory dealers in Austria believe that the present is a favorable time for the importation of American automotive products, provided terms of payment are adjusted to Austrian methods and the types of such accessories are in accordance with Austrian taste and requirements, says Trade Commissioner William Ford Upson at Vienna.

"A desirable arrangement," he cables, "might be to supply firms which are well accredited in the local market under terms of 10 per cent with order and the balance on delivery. Local bank conditions are difficult and dealers are unable to make remittances three or four months before

material is received. To safeguard the interests of the shipper, local purchasers could procure guaranteed letters of credit from the leading Vienna banks, which would pass into the hands of the shipper as soon as shipment is made at the port of departure.

"Interest in American products is general, and with Germany practically eliminated from the market, American makers should be able to compete successfully with those of France and England. Special attention might profitably be given such articles as Brake bands and linings, removable wheels and rims, dry batteries, stop signals, lights and speedometers, and novelty products. A market also exists for gasoline pumps.

Taxi Use Increasing in Hongkong

CONSUL LEROY WEBBER at Hongkong, China, reports that taxi and bus services are growing steadily in the Hongkong district and in adjacent parts of China. He says that 20 taxis were shipped to Hongkong from France in February and were followed in March by 30 more. An additional fleet of 40 machines are to be added later, it is reported, making in all a fleet of 120 owned by the local taxicab company.

In concluding, Consul Webber advises that "a new motor bus service is soon to be inaugurated by a Chinese company, using 10 American-made chassis and as many more locally-converted machines. There is a good market here for a light 2-ton chassis which can be delivered at Hongkong for a price not exceeding \$1,500 gold."

Sweden May Tax Gasoline

THE Swedish Government has introduced a bill proposing a tax of 0.04 crown per liter on gasoline (benzine) to raise revenue for road improvement, and also a duty on imported gasoline of 0.01 crown per liter, according to a cable received from Vice Consul Smith at Stockholm.

"This bill," the cable continues, "is presented as an amendment of the automobile tax law of June 27, 1922, and replaces a proposal recommended by the Swedish Board of Trade that a duty of 0.15 crown per kilo be imposed on gasoline. The proposed bill is expected to pass."

Australia Operates Trucks as Railway Auxiliaries

ARECENTLY organized company, the Railway Auxiliary Motor Co., Ltd., capitalized at £10,000 has placed in operation a number of large motor trucks as feeders to certain lines of the Victorian Railways, Assistant Trade Commissioner E. G. Pauly, Melbourne, reports.

Production Costs Influenced by Progress in Welding Art

Latest improvements in the various processes are outlined at meeting of Welders. New methods developed recently in carbon arc work. Substantial advances have been made in other types.

A SYMPOSIUM on "Flexibility vs. Rigidity in the Design of Welds" featured the technical session of the American Welding Association's annual meeting, which was held in New York, April 23-26. Papers on the subject were presented by representatives of the five methods of welding in common use in the industry, namely, carbon arc welding, metal arc welding, gas welding, resistance welding, and thermit welding.

It was not exactly clear what was meant by flexibility and rigidity in welds and some of the papers bore evidence that the authors were not certain what was meant by the terms. In some cases of welding it is, of course, impossible to reinforce the joint, and the flexibility of the joint then will depend entirely on the character of the weld metal. In other cases an excess of metal may be applied at the weld and the section subjected to the greatest stress in that case is likely to be outside the weld.

J. C. Lincoln, vice-president of the Lincoln Electric Co., who spoke on carbon arc welding, said that as the arc progresses along the joint, the steel is raised rapidly from room temperature to its melting point in a fraction of a second and at this high temperature some action takes place which propels the metal from one side of the crater to the other—from the side toward which the arc moves to the opposite side. This effect can be explained on the assumption that steel at the melting temperature absorbs large quantities of gas and that its capacity for holding gas in solution decreases rapidly as its temperature increases. The metal in both the carbon and the metallic arc acts as if gas was evolved in or behind the heated metal and acted as a blast propelling the metal from the hot to the cool side of the crater, or from the metal electrode to the work.

Weld Metal Needs Greater Ductility

With both forms of arc the metal is raised to about 2000 deg. C. in a fraction of a second and then cools very rapidly, the rate of drop in temperature being of the same order as when steel is quenched in water.

It is sometimes assumed that the metal in the weld is ordinary cast steel, but this assumption is not justified by the facts. The tensile strength of the metal after it has passed the arc is almost equal to that of the original steel, but its ductility is not as great as that of ordinary cast steel. Improvement in electric welding must come from increasing the ductility of the weld metal. That the weld metal is not ordinary cast steel is proved also by the fact that it will not stand up as well under prolonged heating at a bright red heat.

Mr. Lincoln exhibited some magnetization curves which he had obtained from specimens of metal that had passed across the metallic arc and the crater of the carbon arc respectively, the samples being turned up to $\frac{1}{2}$ in. diameter by 10 in. long. Mechanically the metallic arc sample was superior to the carbon arc sample, the latter containing gas holes which reduced its effective

cross section at least 10 per cent. The B-H curves for ordinary cast steel from two samples of carbon arc weld metal and one sample of metallic arc weld metal are shown herewith. It will be seen that the magnetic properties of the weld metal are much below those of ordinary cast steel, the maximum magnetic flux in the metallic arc weld metal being only about two-thirds that in the ordinary cast steel for the same field strength. The carbon arc metal showed up about 10 per cent better than the metallic arc metal. Mr. Lincoln's explanation of the difference in the magnetic properties of the weld metal from the two processes is that the metal is not raised to as high a temperature in the carbon arc as in the metallic arc.

In the present state of the art, metal of high ductility cannot be expected in the weld. Such metal will not stand repeated bending as well as metal of higher ductility and the weld therefore must be designed so as to throw bending strains outside the weld.

Warping Reduced at Certain Speeds

Mr. Lincoln also referred to the warping of the work when plates are welded together. This is due to the expansion of the metal near the seam, due to heating by the arc. When cast iron is welded, for instances, the volume of the fused metal in the weld is 7 per cent greater than that of the same metal when cold. The tensile strength of cast iron is about one-third that of steel and a given strain is much more likely to produce a crack in cast iron than in steel.

Any heating of the edge of a plate ahead of the arc pushes this metal toward the other plate. After the weld is made, cooling of the plates, as well as of the weld metal, tends to draw the plates together. That this action takes place is generally recognized by leaving the plates further apart at the far end. If the whole weld were made all at once, as it is by the thermit process, the weld would tend to open up at both ends, owing to the expansion of the plates along the joint. In the continuous welding of a joint between two plates there are therefore two actions, one tending to close the plates and the other to open them at the far end, and Mr. Lincoln held that if the welding is done at the right speed these effects can be made to neutralize one another.

S. W. Miller, research engineer, Union Carbide and Carbon Research Laboratories, who spoke on gas welding, said that a weld is a casting and the same properties cannot be obtained in a casting as in a forging. The cooling rate of a casting made in a sand mold is different from that of a weld made in that casting, and this alone creates different properties. Difference in chemical composition between base and added metals is another fruitful source of difference in properties.

C. J. Holsag, chief engineer, Electric Arc Cutting & Welding Co., who spoke on metal arc welding, said: The question is, "Shall a weld be made to absorb all the stresses of warpage and bending or shall it be deliber-

ately made to pass these on to the rolled or forged parent metal?"

An electric arc weld is a casting and, fortunately, a very good casting. The weld even may be refined to the point of exhibiting the physical and chemical characteristics of highest grade electric steel castings, which are considered the best. Nevertheless, except in some special cases, it seems fairly obvious that the weld deposit should not attempt to compete in strength with the rolled plate. This plate, originally a casting, has been worked and rolled to a point where it has taken on properties which a plain casting cannot possess.

All electric arc welds should contain an adequate cross section and adequate stiffness to be able to transfer all the strains which occur after cooling to the parent metal, which, supposedly, is better able to withstand these strains.

Although stretched steel is improved by moderate working, continued or intermittent stresses applied beyond the elastic limit will cause fatigue and complete loss of strength. Because of the fatigue tendencies of arc-welded steel, which usually are greater than those of worked metal, no live loads exceeding the elastic limit of the weld should be applied to it.

Sometimes in live-load welding (parts subjected to alternating stresses) an increase in cross-section is not permissible in the member. In this case an extra strong steel weld should be used or some mechanical means should be devised to conduct the stresses to the metal outside the weld. Like any steel casting, the weld may possibly contain internal flaws, and the chances are that these will occur at or near the boundary between the welded and parent metal, unless both are of the same material. This condition is likely to result in the presence of a weak spot under severe continuous or alternating stresses. This weak point may be eliminated by so designing the weld that the stresses will be diverted into the parent metal.

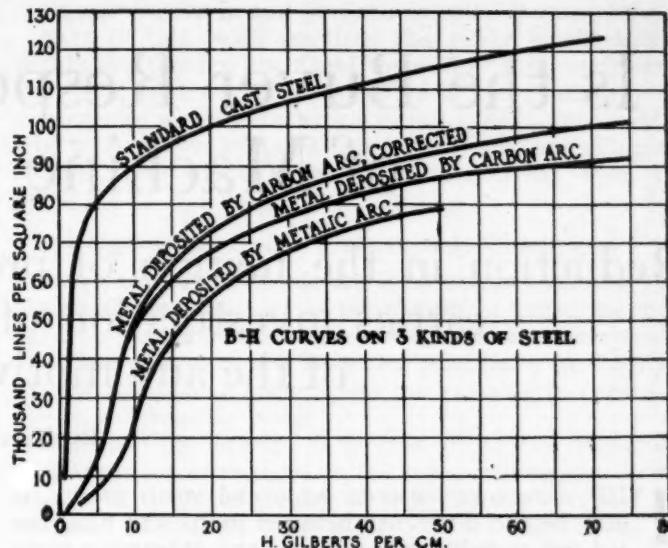
H. A. Woofter, electrical engineer, Thomson Electric Welding Co., who spoke on resistance welding, said that the service required by a welded joint determines whether the weld should be rigid or flexible.

Weld Becomes Stronger Than Parent Metal

Welds in large machine tools, automobile and truck axles, Mr. Woofter stated, should be as rigid as the parent metal, for if the joint were more flexible than the parent stock it would be only a short time until crystallization would take place at the most flexible point, namely, the weld. In practice, however, the weld in such articles as mentioned above is more rigid than the parent metal, due to the pressure applied to push up the weld, which compresses the metal, bringing the molecules closer together more in the nature of a drop forging. Consequently, axles, drill rods, drills, etc., which have been welded invariably break at some other point than the weld. Broken axles have come into the job welding department which showed two, three, and even four, previous welds which were still sound.

In welded joints in band saws and such parts the weld must be flexible, because they are subject to almost continuous bending movement. This flexibility can be secured by annealing the weld, preferably immediately after it has been made. The great majority of resistance welds made in production require no annealing or quenching whatever. This is particularly true of the present practice in making automobile rims, truck wheels, bicycle frames, automobile cranks, etc. All of the above come within the class of resistance welding known as butt welding.

Spot welds, in general, are not required to be flexible.



Showing the B-H curves for ordinary cast steel from two samples of carbon arc weld metal and one of metallic arc weld metal

The process takes the place of riveting, which usually is made as rigid as the riveter could make it. Seam welds, however, are sometimes required to be flexible in the plane at right angles to the face to facilitate rolling or forming, as in the case of barrels, containers, automobile bodies, etc. It is also common practice to make a seam weld by a series of elongated spot welds. These welds must be flexible, as in the case of welded aluminum sheets or steel sheets, which are later drawn or pressed into automobile bodies, containers, etc. Welds in copper rods must be flexible, since the rods are often drawn into smaller sizes, sometimes into small wire.

J. H. Deppeler, chief engineer, Metal & Thermit Corp., who spoke on thermit welding, said that the relative stiffness of welds and parent metal was not such an important question in this process, as it is not applied to sheet, plate and tank welding. The thermit process lends itself perfectly to the production of a wide variety of steels with physical properties within control.

Thermit is fundamentally a mixture of the purest iron oxide and virgin aluminum, which, when ignited in one spot, will progressively react and produce in a fraction of a minute any desired amount of molten iron on top of which floats the slag aluminum oxide, both at a temperature of more than 5000 deg. Fahr. This reduction process is very similar to that in which ordinary iron is made, except that aluminum is used as a reducing agent instead of carbon, and pure iron oxide is used instead of the impure iron ore. Aluminum is a much more active reducing agent than carbon and consequently does not require the application of the prolonged heating used in iron and steel production. Mr. Deppeler exhibited a turning chip which he said was from thermit metal and indicated great ductility.

Considerable discussion arose on the point made by Mr. Holsag that stressing steel beyond its elastic limit tended to increase its ultimate strength.

C. W. Roberts, welding supervisor of the Pennsylvania Railroad, presented figures to show that carbon arc welding costs substantially only one-third as much as metal arc welding. He admitted that the carbon arc process was not applicable in all cases, but held that where it was applicable it should be used because of its economic advantages. The chief requirement in connection with carbon arc welding, he said, was to have a skilled operator, and to produce a skilled carbon arc welder required from three to four years.

Is the Buyer Responsible for the Cost of Machine Equipment?

Reduction in the margin of profit due to increased production carries investigation of costs outside the field of the automotive industry itself.

By Harry Tipper

THE difference between large and small profits, it may be the difference between profit and loss, has led the search for further means of cutting costs of production in the factory farther and farther afield. The purchase of machine equipment is not steady. It is not even seasonal. It is spasmodic.

Since the cost of the automobile is dependent upon the constant maintenance of production at a reasonable percentage of capacity, with the most efficient arrangements of equipment, so the cost of this equipment is dependent upon production conditions and the stability of buying in the machinery field.

The investment in such equipment has increased so rapidly that many factors which enter into the original cost have not been considered in detail.

The automotive industry is by far the largest user of machinery equipment; in many lines it is as much as 70 per cent to 80 per cent of the total market in the United States. Obviously the cost of this machinery equipment to the automotive manufacturer depends to some extent upon his own operations as a buyer.

We are accustomed to look upon the fluctuations in the production curve of automobiles as rapid and large, but the curve of production in most of the lines of machinery equipment shows changes far more violent in character and consequently much more costly to the industry itself.

Causes Uneconomic Manufacture

The machinery equipment business suffers depression early and recovers late, the rate of depression is more rapid and that of recovery slower; so that the industry is constantly working at the least economical points of manufacture, the point of low production and the peak of rush requirement.

Somewhere along the line this necessity of working so frequently under the least efficient conditions must increase the cost to the buyer of this kind of equipment and the automotive manufacturer is the largest buyer.

In another sense, also, the automotive manufacturer is concerned with the efficiency of the manufacturing of machinery equipment. Improvement in machinery design is hampered materially when the manufacturers of equipment are working under conditions so widely variant. The rush of peak requirement is not favorable to the study of production possibilities and the design of new machinery, more adequately adapted to the automotive needs. The difficulty of maintaining organization under low production has much the same effect.

It is true that the machinery manufacturer has not evidenced the study of production which some of the automotive manufacturers would like to see. It is also true that the problem of cheaper production with the

same quality of product has many factors involved which are not specifically related to the equipment, but it is important for the future development of the automotive field that the manufacturers of machinery should have the opportunity to increase the efficiency of their work to a larger degree.

A Question of Engineering Analysis

The amount of money invested in the machinery equipment of the automotive factory and the constant replacement of this equipment, due to obsolescence or depreciation, suggests the importance of a study of the elements in connection with the buying of machinery which at present operate against the maximum efficiency in the buying itself. This study should go along with the study of depreciation and obsolescence within the plant, and the bearing of these matters upon the orderly necessities of replacement. The whole matter is one of engineering study and analysis, with the cost accounting as an element in its consideration.

Examination of the production curves produced over a period of years in the output of the more important types of machinery show very definitely the hazardous and difficult conditions under which these manufacturers have been obliged to work and the effect of the spasmodic and irregular buying upon the plant cost and operation.

The automotive industry will be better served by a strong, well-balanced machinery manufacturing industry. It can contribute to and benefit by a close examination of the factors which go to make up the cost of machine equipment and the relation of these factors to its own requirements.

Adventurous days in the automotive industry are rapidly passing. Economic advances must be made by a careful study of details. As the largest buyer of machinery equipment, the automotive field is vitally interested in the efficiency of that work and the prospective improvements which can be made therein.

Allowances Show Wide Variance

It is evident from all the facts which can be obtained over a period of years that the buying of equipment, particularly machinery equipment, for manufacturing establishments is spasmodic and irregular to a great degree. This arises partly because of the inadequacy of the methods of depreciating the machinery and the difficulty of providing a reserve for obsolescence with the meagre information at present available. The rate of depreciation in the accounting departments of the automotive factories varies widely, and the differences practiced in the individual plants do not explain this variation.

One automotive factory has found it necessary to in-

crease its depreciation to 20 per cent in order to provide adequate reserve for replacement of machinery and the change of equipment to maintain the efficiency of production by the elimination of obsolete machines.

Where the depreciation is figured at too low a percentage the new machinery must be provided for as additional investment, subject to delays and close scrutiny in the factory organization.

Records received from the manufacturing establishments show that in some cases it has been impossible for production authorities to secure appropriations for new machinery until the old machinery had long past the point of economic operation and until the expense involved in repairing and maintaining the equipment was out of all proportion to the original cost. Machines have been rebuilt because it was easier to get an appropriation for rebuilding than it was to secure the necessary funds for new machinery, even though the rebuilding was not economic from the standpoint of the value of the rebuilt machine in proportion to the expense of rebuilding.

Proper Replacement Involves Accounting

There is an accounting study involved in the proper replacement of machine equipment in every part of the manufacturing establishment. It is an engineering problem really, because it relates to the individual rate of depreciation in the particular type of machine involved, the general percentage of obsolescence over a period of years, the relative economy of rebuilding, the point at which rebuilding becomes more expensive than new buying, and the relative economy and efficiency in buy-

ing more regularly and perhaps in smaller quantities.

Part of this work requires the study of conditions within the factory itself and the cost of new equipment. Part of it requires an examination of the machinery industry, the conditions which obtain, the factors which will tend to develop more favorable conditions of manufacture, and the effect of these conditions upon the buyer.

Operating Under Unfavorable Conditions

It is very obvious from the information available that the machinery industry is not operating under the most favorable conditions, except during a small percentage of the time. Most of the time the conditions in the market for machinery are entirely too variable to permit of the best operating plans.

This is very largely, of course, up to the machinery manufacturer himself, as in the rapid development of the past twenty years he has not sufficiently studied the methods of buying adopted by various sections of his market and has not governed his finished inventory in such a way as to maintain an orderly organization of his operations. To a considerable extent, however, this condition is beyond his control.

The automotive manufacturer, as the largest user of machinery equipment, has a considerable influence upon the condition in the machine tool field, and, moreover, he is vitally interested in the progress made in the development of machinery. He can well afford to study the question of efficient machine manufacture; he can arrange his buying in such a way as to increase the efficiency of the operation.

Books Which May Interest You

THAT "Marks' Handbook" has supplied a need is evidenced by the fact that it has gone through eleven printings amounting to 65,000 copies in a period of eight years and that the new edition will be 75,000. Despite condensation the book contains 1986 pages, 150 of which are new matter.

The writers of the various subjects are authorities in their respective lines; in a number of cases specialists have collaborated. The subjects which have undergone most changes are Hydraulics, Heat, Iron and Steel, Non-ferrous Metals and Alloys, Bearings, Steam Boilers, Internal Combustion Engines, Aeronautics and Air Compressors. Drying and Lubrication are new topics.

Though it is published as a ready reference book for the mechanical engineer in general, it offers a source of information for questions which may arise in the automotive field. Power Test Codes and similar material are as of Jan. 1, 1924.

The second edition, priced at \$6, is again published by the McGraw-Hill Book Company, Inc., New York.

CLAUDE IRWIN PALMER, associate professor of mathematics at Armour Institute of Technology and author of "Practical Mathematics," has written a similar and further book entitled "Practical Calculus for Home Study."

Calculus, according to the author, is divided into two parts: Differential Calculus, which is concerned with the *rate of change* of any given quantity which changes or varies, and Integral Calculus, which deals with finding the value at *any given instant*, given the rate of change and the value of some quantity.

It aims to give the essentials of the subject in a practical form for "Men without a college education, but who need a working knowledge and its practical application, and for the man of limited mathematical training." The writer assumes that his reader already possesses a knowledge of algebra, geometry, trigonometry and analytical geometry. He states that Calculus cannot be made easy, but that it can be made plain, and suggests writing him concerning a problem which seems obscure.

This volume of 443 pages is published by the McGraw-Hill Book Company, Inc., New York. Price \$2.

THE volume of highway production is considerably influenced by changes in material and labor prices, according to the Bureau of Public Roads of the U. S. Department of Agriculture. These vary not only in the United States as a whole, but between sections of the country.

The price of common labor, for instance, rose from 20 cents per hour in 1915 to 36 cents in 1918, and to 49 cents in 1920. It then dropped to 36 cents in 1921 and 32 cents in 1922. It then began to rise a little and for 1923 was 40 cents.

These fluctuations, taken together, produce wide variations in the total cost per mile from year to year. For example, if we assume a road with 8000 cu. yd. of excavation, 10,560 sq. yd. of pavement and 75 cu. yd. of structural concrete, and use the prevailing labor and material prices for an expenditure of \$100,000, the mileages, according to the Public Roads Bureau, the United States would have been able to build are: In 1919, 2.9; in 1920, 2.4; in 1921, 2.6; in 1922, 3.3, and in 1923, 3.0.

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Another Concrete Example

ONE manufacturer stocks over 8000 different sizes of piston rings; others stock anywhere from 3000 to 5000 varieties. These facts, developed in a recent survey by the Division of Simplified Practice of the Department of Commerce, simply furnish additional evidence of the need for putting into actual practice more of the theories about standardization long advocated throughout the industry.

AUTOMOTIVE INDUSTRIES has presented many examples of a similar character in the past and has shown specifically how important economies might be effected by a reduction in the number of sizes of various automotive parts. The particular investigation of the Division of Simplified Practice is important, not so much because it develops anything new or unknown, but because it adds another concrete illustration which fortifies the pro-standardization efforts of the Society of Automotive Engineers, of AUTOMOTIVE INDUSTRIES, and of other agencies within the industry.

The car and truck engineers are the logical starting point for further progress in standardization. It is not to be expected that a designer will immediately change his vehicle to conform to standards agreed upon by a large majority of engineers. He can be expected to keep those standards in mind, however, when he is making a new design and to work them into his revised construction wherever possible.

Manufacturing executives should encourage, and even demand, that careful attention be given to use of standards in new designs. In the service as well as the manufacturing field thousands of dollars may be saved by a little more study of this particular problem.

Volume and Profits

SALES, rather than production, are the real gage of prosperity. Viewed from both angles, however, the automotive industry is in good shape at the present time. Dire predictions of a slump have not materialized up to date.

Production has fallen off; sales are not as large as were expected by those whose slogan was "5,000,000 motor vehicles in 1924"; this year will not be a record-breaker from a production standpoint. These facts are admitted by nearly everyone at this time.

Whether 1924 is to be a good year or a poor one depends very largely on the point of view. Those who consider volume and size as synonymous with success may not be entirely pleased with the 1924 showing. But the great majority of executives, who have come to realize that volume and profits do not always go hand in hand, probably will not be disappointed with the showing when the books are closed next December.

In the midst of depression talk, relatively favorable reports are coming in from many sections of the country. C. A. Vane of the N. A. D. A., returning from a tour of the Northwest, says "Business conditions in the Pacific Northwest and in the intermountain States are the best this year in the last five years." Analysis of new and used car sales in Cleveland shows that sales in the first quarter of this year were considerably in excess of the same period last year. In the month of March, in Cleveland sales of used cars amounted to about 5600, as against about 4000 in 1923, while the new car total was 3600 in 1924 and 3000 in 1923.

Production in April was about 12 per cent less than in March, a smaller decline by some 5 or 10 per cent than had been expected by many observers. One small assembler reports sales for every month of this year, including April, in excess of his 1923 output.

These favorable aspects of the present automotive situation should be noted when attempts are being made to size up the trend during the next few months.

A strong tendency is growing in various parts of the industry to readjust perspective as regards the relation between profits and volume. There is a very definite point at which increased volume cannot be expected to bring lower unit costs and increased

profits. The point of diminishing returns already has been reached by more than one company.

The rate of production will not continue to grow as rapidly as in the past, since the industry is getting into its period of stability. Ability to make profits in the future will rest upon many factors other than the ability to produce at a constantly increasing rate. Car manufacturers are beginning to think in terms of dealer profits to a greater extent than ever before, and this tendency probably will increase as time goes on. Every link in the chain of automotive distribution must make a profit if the producer of the complete vehicle is to have permanent success.

The industry as a whole is building its plans for the future on a profit-making basis. The relative importance of volume is being understood more clearly than at some times in the past.

Brake Safety Code Needed

ANNOUNCEMENT to the effect the American Engineering Standards Committee has requested the Society of Automotive Engineers, the Bureau of Standards and the American Automobile Association to become joint sponsors for the formulation of a safety code on automobile brakes and brake testing should serve to emphasize the fact that there is need for such a code as a guide to legislative and other bodies which are being called upon to formulate laws and ordinances attempting to define what constitutes safe braking ability of cars and trucks and how this braking ability should be measured.

Unless some logical basis for legislation in this respect is formulated a miscellaneous series of ordinances are certain to arise to complicate sales and other problems and give manufacturers no end of trouble. Experiences along similar lines in reference to headlamps and truck ratings have cost the industry much worry and no little expense. Probably it is too late already to avoid entirely complications of this character, but they most certainly can be minimized by getting behind the organizations which are willing to do a logical and needful work in the interest of uniform regulations and safety as controlled by braking capacity and effectiveness.

If financial assistance is required, as undoubtedly it will be if the job is to be completed expeditiously, the industry will save money in the end by giving immediate financial support to the project. It should also afford hearty cooperation in other ways, for humanitarian if for no other reasons. Few parts of cars and trucks have so important a bearing upon safety as do the brakes, and the industry not only will help to promote safety, but will serve itself to best advantage if it gives the most effective assistance to those who are seeking to formulate regulations calculated to assure reasonable and adequate stopping ability for all road vehicles.

Much has been done during the past year toward improvement in brake design and effectiveness, but the advantages which these improvements have brought to the user can be nullified all too easily if he is careless about keeping the car's brake equip-

ment in safe operating condition. Experience has shown that such carelessness must be checked through some form of brake inspection and it certainly will be an advantage to the industry to have such inspection under a logical and reasonable code than in accordance with more or less haphazard ordinances.

When Users Pay Double for Service

EVERY automobile dealer worthy of the name knows that a car with a good reputation is far easier to sell than one with a name for unsatisfactory performance. Reputation is built up partly by the dealer but is due largely to qualities which are put into the car or are lacking in it because of the foresight, or lack of it, which the manufacturer exercises.

That excessive costs for servicing are a serious handicap and have much to do with the repute which a car acquires is evidenced by the fact that most car manufacturers in recent years have taken steps to lower the charges made for service. Few if any of them have gone the whole way in this regard, however. Service operations still are complicated seriously in many cases because accessibility has been subordinated in the design.

If this were not true there could not exist a condition such as that mentioned in these columns recently in which it was shown that, for cars of about the same cost, size, number of cylinders and general type, the charge for the common operation of grinding valves, removing carbon and tuning engine varies from \$14 to \$42.50. Many other cases of similar nature have been cited.

Car, as well as truck owners, frequently compare notes and are more than likely to do so when buying new cars or trucks. When they find discrepancies such as that cited they certainly are less likely to buy the car with the reputation for high service cost than the one for which service charges are known to be more reasonable.

The owner of a small fleet of trucks which are used for the delivery of merchandise and handling of incoming and outgoing freight said the other day that he never would buy another truck of such and such a make because he considered the charges for service outrageous, as compared to those for similar work on other trucks he owned. In this case the truck condemned has an excellent reputation in other respects, but the maker is losing customers which it cost him much effort to secure because service charges are too high.

One manufacturer who put a new low priced car on the market this year is reported to have made a careful study of service costs before the car was put into production. Every important service operation was compared to that for similar work on competing cars and if found to be materially higher, the design was changed to remedy the fault. If all car and truck makers would follow a similar procedure there would be less just complaint about service charges and fewer sales would be lost because service costs too much.

PRODUCTION TO INCREASE GRADUALLY

Steady Purchasing Is Reducing Stocks

Factory Organization Will Not Be Sacrificed Pending Depletion of Car Surplus

DETROIT, May 6—Production totals for the month of May will show increases over April, according to present indications, due to the plans of some leading companies to extend their schedules beyond those of late March and April, when they were curtailed. The indications are that output will be increased only to the extent that better weather and increased buyer confidence will warrant. Stocks of cars in dealers' hands are reported showing gradual reduction under the influence of steady if not conspicuous buying.

The strategy of the entire industry is being directed to clearing out all dealer stocks as rapidly as possible without, however, sacrificing factory organization through marked slowing down. General confidence is expressed that this will be accomplished in the next 45 days at most, permitting gradually increased operation throughout the period.

Ford output during April approximated 175,000, with retail deliveries running to possibly 230,000. When complete figures are available, May production is scheduled to hold to about this same figure, while deliveries are expected to run in excess of 250,000, and with good weather and good sales conditions may approximate 300,000.

Plants at Capacity

Capacity operation will continue at Dodge Brothers and the Hudson-Essex figure will continue at close to the scale of operations during the two past record months. Some factories, notably Buick, will increase operations in May. The general tendency is toward increased operations during the month, but as this is entirely a matter of developments, factories are not setting definite schedules.

Most of the April schedules were revised downward during the course of the month. Opposite action is looked for in May with revisions upward from rather low production at the outset.

Good movement of used cars during the month will result in much greater movement of new cars, according to factory estimates, evidenced by the fact that in many cities of the country selling in April was confined to straight deals in which no trade was involved.

Shortages of particular models are being reported by factories, while other models in the same line are slow in moving. This apparent popularity in cer-

Business in Brief

NEW YORK, May 7—Irregularity in conditions is noted in the reports on business last week. Retail trade picked up slightly, but wholesale trade if anything was quieter, while building was the main activity in industry. Weather conditions, of course, had something to do with this.

There was a drop in prices of all metals, while the steel output apparently is about 20 per cent off the peak in March, occasioned, it is reported, by the slackening in building needs and a lessened demand on the part of automobile manufacturers. Bituminous coal is slack, and anthracite has advanced 10 cents a ton.

In the textile world cotton slacked, while there was only a moderate ordering of woolen goods, with raw silk prices firmer.

A spotted condition prevailed, with crops, winter wheat showing an improvement generally, while spring wheat seeding has been delayed in the Northwest and Canada by bad weather. Oats are well advanced, and corn planting is under way in Kansas and the Southern sections. Cotton crop news is being watched, the Southern view being that the heavy exports and backward season will sustain the market. Exports have reached almost 5,000,000 bales to date, an increase over last year.

Car loadings were about at the same level for the week ending April 19 as for the week of April 12, showing 876,923 in comparison with 881,299. A year ago this time the total was 958,042. For the sixteen weeks of 1924 loadings of revenue freight totaled 14,207,592 cars, as against 14,118,558 last year.

Bank clearings for the week ending May 1 aggregated \$8,782,243,000, a gain of 17.4 per cent over the preceding week.

In the market, stocks rallied after a decline, with investment bonds strong on the lower bank rate in New York.

tain models will provide sufficient buying to warrant rather extensive operations at factories while awaiting the period in which complete operation can be safely resumed. In the meanwhile, however, factory organizations are intact and there is not regarded much likelihood of any serious unemployment developing.

Jewett Prices Cut for English Market

Reduction of \$440 Follows Gov- ernment's Action in Remov- ing Import Duties

DETROIT, May 5—In anticipation of the removal on Aug. 1 of the McKenna duties of 33 1/3 per cent on motor car importations into Great Britain, the Paige-Detroit Motor Car Co. has announced a reduction in the price of the Jewett in that market from £395 to £295.

This reduction, (equivalent to \$440) was made effective immediately, it was stated, to forestall any possible loss in business that might come between now and August through removal of the duty.

The action was taken following the receipt of cables from the London representatives of the company last week detailing the present budget proposals. Further cables just received by the company say that 50 cars were sold immediately in London after this decrease and the belief is held that the

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Benz and Daimler Plan Economies by Merging

MANNHEIM, GERMANY, April 25 (by mail)—The director of the Benz Co. in Mannheim and Gaggenau and the Daimler Co. in Untertuerkheim and Marienfelde have decided on a "unity of action."

A proposal is to be laid before a general meeting of stockholders that the yearly profit of the two companies shall be thrown together and divided pro rata.

All members of the board of directors of the one company are to be elected to the board of the other at the general meeting and at the same time all managers of the one company are to enter in the managerial board of the other. The head of the unity of action is a working board, formed by three directors and three managers of each company.

The main purpose of this "unity of action," lasting up to Dec. 31, 2000, is to eliminate completely the competition between the two companies and to make possible a common manufacturing platform, resulting in considerable saving in production. In the same manner the facilities for buying raw materials and selling motor vehicles are to be combined.

German Delegation Lands at New York

Fifteen Representatives Come Here to Attend World Motor Transport Congress

NEW YORK, May 6—Germany's delegation to the World Motor Transport Congress, which will be held in Detroit May 21-24 under the auspices of the National Automobile Chamber of Commerce, reached here this week on the Ballin. It is the first of the foreign contingents to arrive.

There are fifteen in the party, headed by Ludwig Buchkremer, president of the German Automobile Dealers Association, Cologne, aged eighty-six years, but looking thirty years younger. Mr. Buchkremer at one time was one of Germany's biggest body builders, but since the war has entered the retailing end of the automotive industry.

Secretary of Association Here

Among those in his party are Johannes Buschmann, director and secretary of the German Automobile Dealers Association, Berlin; Paul Fehling, Berlin; Hermann Boissbarth, Munich; Waldemar Dittman, Weimar; Louis Glueck, Dresden; Friedrich O. Lueg, Bochum; Anton Ruetgers, Aix-la-Chapelle, and Carl Stratemann, Bielefeld.

Arriving in New York, the delegation was welcomed by George F. Bauer, secretary of the Foreign Trade Committee of the N. A. C.; M. H. Hoepli of the General Motors Export Co., and Augustus Zimmerman of the Automotive Division of the Department of Commerce. A luncheon was given today by Mr. Bauer at the Automobile Club of America, at which the visitors were introduced.

The visitors are greatly impressed with New York and delight in telling of their experiences yesterday when, in order to study American traffic control, they called on Police Commissioner Enright, who sent them out under escort to inspect Fifth Avenue. They traveled over the avenue at the rate of 50 m.p.h., the police clearing the way by hand signals so easily as to astonish the delegation.

Boat Trip Planned

From here they go by boat up the Hudson to Albany, where they will board a train for Chicago and Milwaukee, following which they will go to Detroit to spend the time in inspection of plants, etc., prior to the convening of the convention.

The Germans believe that the lifting of the embargo against the importation of automobiles will result in American manufacturers selling at least 25,000 cars in Germany in the year following the dropping of the bars. They say the demand for cars is keen, the only drawback being the lack of money. At the present time German production does

Outstanding Features in New Models Are Important in Creating Desire for Ownership

AN INTERVIEW WITH JOHN GUY MONIHAN,
Automotive Division of the Newport News Shipbuilding Co.

By D. M. McDonald,
Detroit News Representative of the Class Journal Company

Detroit, May 7.

DRAWING on his experiences as a pioneer in the passenger car manufacturing business, John Guy Monihan, of Premier and Harroun fame, now of the automotive division of the Newport News Shipbuilding Co., sees several reasons in addition to poor weather conditions as responsible for slow business in the automobile field at the present time.

One of the principal of these, says Mr. Monihan, is the absence of some particular feature in cars to make present owners want to change over to the new models. This is taking into consideration the possibility that the retail forces of the industry could handle the number of trades that would be involved. Good weather, always the most important item for moving used cars, will come sooner or later, then if used car prices are right they can be moved successfully.

Outstanding features in new models, creating the desire for ownership, automatically has the effect of reducing owner valuation of his present vehicle, says Mr. Monihan, making it possible for dealers to take them in and move them quickly at low prices and without involving losses. He declares that unless there are outstanding new features looking toward reliability as in engine or chassis design; safety as in four-wheel brakes; style as in body or general design, or comfort and style as with balloon tires, owners are inclined to take the position there is no reason to change to a new car, or if they do, are inclined to look for too high allowances. Over-all allowances as an inducement to move new cars are economically unsound, says Mr. Monihan, and should not be resorted to.

In balloon tires, Mr. Monihan sees the opportunity for manufacturers to get cars moving at once on a sound basis, and he suggests that as fast as they become available manufacturers put them on, and absorb small losses now rather than heavy losses later. Owners are waiting for balloon tires or some similar outstanding development to become especially interested in new car buying, says Mr. Monihan, despite the fact that there is more ready money in the country and in the possession of the average family than there ever was formerly.

Mr. Monihan sees in the practical saturation of present roads by low priced cars, a distinct falling off in the driving of cars for diversion, this being especially true of the owners of high-powered cars, formerly accustomed to this form of recreation. Until more roads are built these owners will turn to other forms of diversion.

Were aviation more advanced, Mr. Monihan said, there might be expected a special development in this field. Aviation, however, as a general attraction is out of the question at this time, he said. The most likely attraction under all circumstances is the water, and here so confident is Mr. Monihan of possibilities of the development of a new era of boating, that he declares his company is preparing to manufacture in quantity a gasoline powered cruiser designed specifically for week-end or short trips.

This project of the company will come within the sphere of its automotive division, because the powerplant will be similar in type to those used in automobiles. It is the plan of the company to market these boats through automobile dealers in all sections of the country adjacent to suitable bodies of water, preferably those dealers selling higher grade cars. The price of the boat because of quantity output will compare with that of better grade cars and for this reason the merchandising is regarded by Mr. Monihan as fitting in acceptably with motor car sales.

not total more than 35,000 a year. Closed cars are growing in popularity and it is said that probably 50 per cent of the present output is of that type, in comparison with 75 per cent open cars a year ago.

Once the commercial treaty between Germany and the United States is ratified by the United States Senate, it is expected that there will be an expansion in motor transport in Germany. Right now dealers complain of the action of the Reichsbank, corresponding with the American Federal Reserve Bank which has refused to rediscount auto-

(Continued on page 1051)

Swedish Ford Company Formed at Stockholm

NEW YORK, May 6—A cablegram from Stockholm announces the organization of the Swedish Ford Co., to maintain an assembling plant and with a registered capital of 1,000,000 crowns.

This action was expected, since the Ford Motor Co. stated several months ago that such a plant would be established in Sweden. It is planned to make Stockholm the distributing point for Ford cars, not only for Sweden, but for other countries of northeastern Europe.

Goodrich Purchases English Tire Plant

Acquisition Prompted by Desire of Britishers to Have Home-Made Product

AKRON, May 8—Economy of production and demand on the part of English motor car owners for English made tires motivated the purchase by the B. F. Goodrich Co. of the Ajax Tire Works Co. of Lancashire, England, according to President B. G. Work.

The plant was purchased, Mr. Work said, after he had gone to England to find an English manufacturer for Goodrich tires. Manufacturing the company's product in England has the double advantage of being done at very much reduced costs and at the same time meeting the demand on the part of the British tire users for English made goods, it is stated.

Mr. Work in his official announcement stated that the purchase was really a merger between the B. F. Goodrich Co., Ltd., and the Ajax Tire Works Co. The B. F. Goodrich Co., Ltd., is the selling organization of the Goodrich company.

American Exports Decline

During the past few months it has been pointed out that American exports to British markets have dropped constantly not only in England, but in the colonies as well, although the American and other foreign makers of tires still controlled the English markets at the expense of the British manufacturers.

The exports to England during the first quarter of the year amounted to only \$427,522 as compared with \$898,486 during the same period last year. New Zealand imported only \$85,656 worth of American tires during the quarter as compared with \$323,275 during the same period last year. British South Africa dropped from \$232,576 during the first quarter of 1923 to \$72,467 during the first quarter of this year.

These reductions indicate to the American manufacturer that the British people in the face of the unsettled labor conditions in the kingdom have decided to favor British made goods and it was to satisfy this demand that the Goodrich company took over the Ajax plant. When Mr. Work went to England several weeks ago, it was with the intention of finding a manufacturer for the company's product in England, he stated, and only the advantageous offer of the Ajax plant changed this intention.

Securities Underwritten

The financing of the new purchase which is being done in England involves approximately £900,000. The securities have all been underwritten and will be sold in England so that the new company is practically an English company, but having the advantage of American development and engineering methods.

Labor is so cheap in England that it has been pointed out in the rubber industry that it might be possible for the Goodrich company to make tires in England and ship them to America cheaper than they can be made and sold in the United States.

A year ago the Goodrich company took over the controlling interest in the Ames-Holden Tire Co. of Canada, which opened the Canadian and colonial market on a par with English and colonial manufacturers, while several years ago the company acquired a plant in Paris.

The company lost its plant in Japan during the disaster of last September and plans regarding future activities have not been announced by the company although the plant has not as yet been rebuilt. The loss on this plant was in excess of \$500,000.

The English plant can employ at capacity at least 3000 men and women. The production rate has not as yet been announced here.

General Motors Made 57,000 Sales in April

NEW YORK, May 5—April sales of cars and trucks by General Motors units totaled 57,000, a decided drop from the pace maintained in the first quarter, and below March's 73,756. A year ago April sales reached 75,822.

Sales for the first four months of this year, however, are in excess of the same period in 1923, 269,670 as against 252,080. The April drop is in keeping with the general slowing down of retail sales in that month, occasioned by the backward spring.

Figures as given out show the following sales for Buick, Cadillac, Chevrolet, Oakland, Oldsmobile and GMC trucks.

	1924	1923
January	60,918	49,162
February	77,996	55,427
March	73,756	71,669
April	57,000	75,822
May	75,393	
June	69,708	

Hup Closed Car Output Mounts to 58 Per Cent

DETROIT, May 7.—Hupmobile closed car production for the first 110 days of the year was 50 per cent of the factory's entire output, including production for Canadian and foreign trade. This compares with a percentage of 28 for all production in 1923. Since April 1, 58 per cent of the entire production has been centered on closed models.

The five-passenger club sedan has been the biggest seller of the closed models, according to factory reports, 32 per cent of the entire output being of this type, with the standard sedan, four-passenger coupe and two-passenger coupe following in that order.

Canadian closed car shipments are reported to have grown from a negligible ratio a year ago to 28 per cent of the entire Canadian total. Closed cars have constituted 52 per cent of the domestic output since Jan. 1.

R. H. Grant Manages Sales for Chevrolet

Takes Place Formerly Held by Colin Campbell—Dawson and Eddins Assistants

DETROIT, May 8—Formal announcement is made by the Chevrolet Motor Co. of the appointment of R. H. Grant as vice-president and general sales manager, taking entire charge of the company's sales department as of May 1. Mr. Grant is the successor of Colin Campbell as the general sales executive of Chevrolet. C. Earl Dawson, who has been acting manager, and D. S. Eddins will continue as assistant general managers.

Mr. Grant came with Chevrolet Feb. 1 from the Delco-Light Co. of which he was president and general manager. His appointment at that time was as assistant to W. S. Knudsen, although in view of his long experience in merchandising work the impression in the industry was that he was to assume the direction of the sales department. This view is confirmed with the official announcement now made.

Since February, Mr. Grant has spent practically the entire time on the road visiting the Chevrolet sales zones and acquiring a definite first-hand knowledge of conditions, so that in assuming his new duties he is personally conversant with general sales conditions throughout the country.

Through his connection with Delco-Light, which is a subsidiary of General Motors, Mr. Grant is widely known in the industry. He was connected with this business since its inception, and was especially active in building up and directing the methods of merchandising farm lighting and refrigerating equipment.

Before organizing the Delco-Light company he was sales manager of the National Cash Register Co. of Dayton. Mr. Grant was with this company for 12 years, working his way up from salesman to the position of sales manager.

Everard Thompson Dies While on Way to Japan

NEW YORK, May 5—The United States Rubber Co. has been advised of the death by heart disease in San Francisco last week of Everard Thompson, its recently appointed manager of Japanese territory, who was en route to his new station in Tokio.

For several years Mr. Thompson has been doing special investigating work in foreign countries, first for the Firestone company and later for the United States Rubber.

Mr. Thompson was general manager of the Sheepshead Bay speedway, superintending the construction of New York's big track. He also conceived the idea of the Yale Bowl.

Tax Bill Starting Last Lap of Course

No Fight Is Expected in Conference Over Provisions in Automotive Section

WASHINGTON, May 7—Because of the similarity of the tax reduction on automotive products written into the new tax bill, as adopted by the House and Senate, there is little likelihood that any change will be made in the automotive section when the two bills go to conference. The only material change made in the Senate was in the interest of clarifying the meaning of the section and was adopted at the suggestion of the National Automobile Chamber of Commerce.

Provisions in Section

The section as passed by the Senate, which will become the law under which the automobile industry must pay its Federal excise taxes in the future, is as follows:

"On and after the expiration of thirty days after the enactment of this Act there shall be levied, assessed, collected, and paid upon the following articles sold or leased by the manufacturer, producer or importer, a tax equivalent to the following percentage of the price for this sold or leased:

"(1) Automobile truck chassis and automobile wagon chassis sold or leased for an amount in excess of \$1,000 and automobile truck bodies and automobile wagon bodies sold or leased for an amount in excess of \$200 (including in both cases tires, inner tubes, parts, and accessories therefor sold on or in connection therewith or with the sale thereof), 3 per cent. A sale or lease of an automobile truck or of an automobile wagon shall, for the purpose of this subdivision, be considered to be a sale of the chassis and of the body;

"(2) Other automobile chassis and bodies and motorcycles (including tires, inner tubes, parts and accessories therefor sold on or in connection therewith or with the sale thereof), except tractors, 5 per cent. A sale or lease of an automobile shall, for the purpose of this subdivision, be considered to be a sale of the chassis and of the body;

"(3) Tires, inner tubes, parts, or accessories for any of the articles enumerated in subdivision (1) or (2), sold to any person other than a manufacturer or producer of any of the articles enumerated in subdivision (1) or (2), 2½ per cent. This subdivision shall not apply to chassis or bodies for automobile trucks, automobile wagons, or other automobiles."

Verbatim Report of "Debate"

The "debate" on the automotive section when it came up on the floor of the House consisted only of an exchange of questions between Senator Edge, author

of the automobile relief measures in the Senate, and Senator Smoot, chairman of the Senate Finance Committee, which reported the measure to the Senate. The discussion, taken verbatim, is as follows:

Mr. Edge Mr. President, I understand we have reached Title VII which deals, among other things, with excise taxes on automobile parts, accessories, motor trucks, and so forth. I ask the Senator in charge of the bill if the Senate Finance Committee has in any way changed, and if so to what extent, the reduction in excise taxes under this head made by the House?

Mr. Smoot. About the only change that is made by the Senate Committee is found on page 195, lines 5 and 6, which reads as follows:

—and automobile truck bodies and automobile wagon bodies sold or leased for an amount in excess of \$200.

In further answer to the Senator, I will say that section 700, paragraph 1, automobile trucks, is the result of a combination of

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Bassick-Alemite Buys Allyne Zerke Interest

CHICAGO, May 8—The Bassick-Alemite Co. of Chicago has acquired a large interest in the Allyne Zerke Co. of Cleveland, according to information given out today by a representative of the Bassick interests.

The Bassick company manufactures and distributes the Alemite lubrication system for automobiles while the Allyne Zerke company is maker of an automobile lubricating device. Just how the new arrangement will affect either organization remains for developments to unfold, it being said that "details are to be worked out" and that for the time being the association will be merely cooperative.

The negotiations involved no transfer or re-issuance of stock, each company to retain its own individuality. E. W. Bassick of Bridgeport remains as president of the Bassick company and E. E. Allyne of Cleveland retains the presidency of the other company. It is stated, however, that the retail selling of both company's products will likely be conducted by the Bassick company.

Reports that a merger of the Stewart-Warner Speedometer Corp. and the Bassick-Alemite Co. is being negotiated have been denied by both sides, a Bassick spokesman saying "there is nothing to it" and the story being characterized by a Stewart-Warner official as "stock wire talk."

Chevrolet Establishes Another Service School

JANESVILLE, WIS., May 8—The Janesville division of the Chevrolet Motors Co. has opened an organized service school, the second to be established among the various Chevrolet branch production units in this country. Sixteen pupils from three States are taking the initial 10-day course of instruction, provided gratis by Chevrolet for the benefit of workers in the service stations of Chevrolet dealers.

McCord Announces New Type Radiator

Novel Features Embodied in Design—Details of Construction Are Outlined

DETROIT, May 8—McCord Radiator & Manufacturing Co. has developed a new type of radiator having a number of novel features. After assembly, the structure of this radiator is of the same form and appearance as the McCord fin and tube type. The latter is made up of fins perforated to receive the tubes. These tubes are made from a ribbon of copper or brass which is tinned on both sides before forming. After the completed tubes are assembled with the fins, the entire core is run through an oven in order to solder the fins to the tubes.

One advantage of the improved type of radiator is that this coating of solder upon the tubes is done away with. The heat conductivity of a tinned tube is less than that of an untinned tube. Furthermore solder increases weight and expense. Hence it is a great advantage to reduce the use of solder in a radiator to a minimum, or to dispense with it altogether. So far as the dissipation of heat is concerned, the solder used in the new type is said to have no effect.

Construction Details

The construction of the new radiator is as follows:

From the fins as formerly used are drawn down a series of ferrules, or tubular projections, slightly tapered at their lower extremity. These projections are arranged in rows lengthwise and transversely of the fins. It will be seen readily that if one fin is superimposed upon another, with the lower points of the projections on the fin above entering slightly into the top opening of the fin below, and this operation is continued for the full height of the radiator, it will give a core having a series of fins with water passages formed by the drawn projections down through the full depth of the core.

The tips of the projections are dipped in solder. After assembling, the core is baked and the result is a continuous tube from top to bottom. As the tube is formed as an integral part of the fin, the heat is conducted directly to the fin without any joint or interposition of solder. The result is more direct conductivity and more rapid heat dissipation.

Outside of the core, the construction as to the tanks and the frame is the same as in the fin and tube type. As the continuous tubes are done away with, an independent tie between the top and bottom tanks becomes more important in order to remove the strain upon the soldered joints. This is accomplished by the use of the channel side supports such as now are used on the McCord Tubular Type. This feature is covered by the Cain patent owned by McCord.

Receivership Ended of American Bronze

Company in Good Condition—
All Creditors to Receive
100 Cents on Dollar

BERWYN, PA., May 6—The American Bronze Corp. of this city, maker of non-gran bearing bronze, is out of the receivership under which it had been operating since Aug. 8, 1923, through the action of Judge Thompson of the United States District Court, Eastern District of Pennsylvania.

Following this court action, a new board of directors has been chosen, E. G. Anderson being retained as president, William F. Fischer as vice-president, G. Willard, Frame, treasurer, and John C. Smith, secretary.

The new board includes, besides Mr. Anderson and Mr. Fischer, who is president of the Fischer Machine Co. of Philadelphia, Philip E. Guckes, president of the Integrity Trust Co. of Philadelphia; George M. Huey, president of the Denny Tag Co. of West Chester, Pa., and S. B. Rheam, president of the Central Boiler Tank & Plat. Works, Pittsburgh.

It is stated that all creditors will receive 100 cents on the dollar and that the company is in good condition. During the nine months of the receivership, the business was operated at a substantial profit, it is claimed, a condition rather unusual in such matters.

New Blue Bird Model Produced by Overland

TOLÉDO, May 7—The Overland Blue Bird, a new touring model with balloon tires, is the newest body creation of the Willys-Overland Co. The finish, in keeping with the name, is in blue, a peacock blue, which is further set off by black fenders and running gear. Further enhancing of the color scheme is obtained

through the nickelated radiator, windshield stanchions and door handles. The upholstery is a bluish shade to match the body and the top is a similar hue.

Balloon tires are standard equipment, these being Fisk 31 x 5.25. The standard equipment is wood artillery wheels with natural finish, but a set of five disk wheels is furnished at an extra cost of \$25.

The wheelbase is 106 in., the same as on the Red Bird, which was brought out last year. All the mechanical specifications of the car that have been used by Overland for some time are retained, including the triplex springs which give to the new car a spring base of 136 in. The price of the new model is \$725.

Bill Carrying "Dead-End" Roads Vetoed by Governor

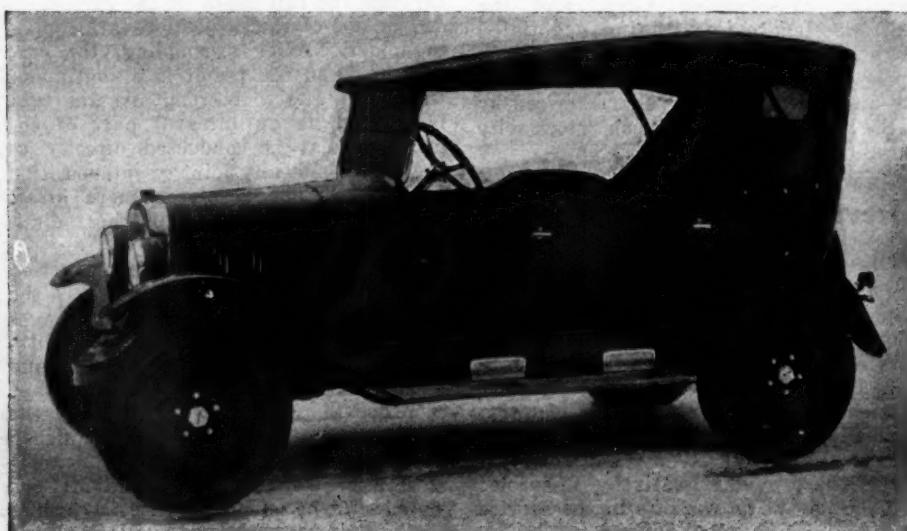
ALBANY, N. Y., May 6—Governor Smith has gone on record as being opposed to the laying out of highway routes by legislative enactment. He did this by vetoing the Byrne bill, providing for a new State highway map, and declared that the recent Legislature, beside adding roads which would have cost the State \$40,000,000 to construct, inserted in the bill thirty-one miles of what are known as "dead-end" roads, which start all right but end nowhere.

Said the Governor:

I am strongly of the opinion that the constitution should be amended in order to prohibit the laying out of highway routes by legislative enactment. It is not a legislative function. It is administrative and can best be carried out in the interest of the State by the engineers employed by the State for a study of the whole question of road construction.

I am unable to bring myself into a frame of mind where I should, by my approval of this bill, give countenance to the legislative log-rolling that succeeds in changing these maps after they leave the properly constituted engineering department and have the unanimous approval of those interested in a comprehensive State development of our highway system.

Overland Blue Bird Carries Balloons and Lists at \$725



Durant Motors Plans Buying Star Company

Stockholders Will Act on Question
of Acquiring Latter's Assets
on May 23

NEW YORK, May 7—W. C. Durant has asked stockholders of Durant Motors, Inc., to ratify a proposal for an increase in the authorized capital stock of the company from 2,000,000 to 3,000,000 shares in order that the parent concern may take over the assets of Star Motors, Inc. A vote on this proposal will come up at the annual meeting May 23.

Under the arrangements now existing between the two, Durant Motors, Inc., is the manufacturer and Star Motors, Inc., is the sales agent. If Durant Motors purchases the Star assets, it is possible the latter company will be dissolved and its stock distributed among Durant shareholders or it can be continued as a holding company, with Durant Motors functioning in both manufacturing and sales.

Which step will be taken will depend upon the vote of the stockholders. If it is decided to turn over the Star assets to Durant Motors, it will result in the nullification of the sales contract between the two organizations so that in future business will be conducted by the Star distributors direct with Durant Motors, it is said.

President Durant's letter to stockholders says in part:

Your directors feel that the relations between your corporation and Star Motors, Inc., must of necessity be so intimate that far better results would be obtainable if all the assets of Star Motors, Inc., could be acquired by your corporation, and the business of the two enterprises could be conducted without divergence in interests.

For that reason a proposal has been made to Star Motors, Inc., to acquire all of its assets, for a consideration payable in the stock of Durant Motors, Inc., in an amount which would enable the stockholders of Star Motors, Inc., to receive one share of stock in your corporation for every two shares of stock of Star Motors, Inc., now held by them.

Miles of Copper Tube Used Daily for Ford Radiators

DETROIT, May 7—Statistics issued by the Ford Motor Co. on the radiator department at the Highland Park plant show the use of 254 miles of copper tubing a day to meet the present production schedules of approximately 9000 radiators. In addition to the copper tubing other materials used in a day's output comprises 38 tons of sheet steel, six tons of terne plate, 67 tons of brass, nine tons of solder, 18,000 malleable castings, more than four miles of brass tubing for drains and 1068 gallons of acid.

In the making of a single radiator 140 operations are necessary and every step of the manufacturing process requires unusual care, the company states.

Men of the Industry and What They Are Doing

Whiteacre Named Chief Engineer

C. J. Whiteacre, for eleven years connected with W. C. Durant, has been appointed chief engineer of the Flint Motor Co. of Flint, Mich. Mr. Whiteacre started with the Chevrolet Motor Co. in 1911, going to the Mason Motor Co. as assistant chief engineer and later returning to Chevrolet. Upon the taking over of the plant of the Sampson Tractor Co. by the Chevrolet company, he became chief engineer. For a number of years prior to his affiliation with the Flint company, he held the position of consulting engineer for the General Motors Corp. at the central laboratories in Detroit.

Birdsell Made Sales Engineer

Roger Birdsell, formerly connected with the Bureau of Standards at Washington, is the new sales engineer of the Racine Radiator Co. of Racine, Wis. In his new connection he will devote his attention to the special engineering of radiators and cooling systems.

Rutherford Touring Country

W. O. Rutherford, vice-president of the B. F. Goodrich Co., has started on a trip through the South and as far as the Pacific Coast, holding sales conferences in all branch centers with the company's sales representatives. He will be gone two months.

Robb Succeeds Speer

F. H. Robb has been appointed superintendent of the automotive service of the Westinghouse Electric & Manufacturing Co., succeeding M. B. Speer, who has associated himself with other interests. Mr. Robb has been with the Westinghouse company since 1919, and for the last four years has been district service supervising engineer in the Chicago territory. His new headquarters will be at Springfield, Mass.

Owen to Speak in Detroit

Percy Owen, chief of the Automotive Division, Department of Commerce, will be one of the principal speakers before the Foreign Trade Conference, to be held under the auspices of the University of Detroit, on May 16. Mr. Owen will speak on "The World Markets for Automobiles."

Wall Becomes Consulting Engineer

William G. Wall, formerly chief engineer of the National Motor Car & Vehicle Corp., has hung out his shingle as consulting engineer, with offices in the Merchants Bank Building, Indianapolis, where he will carry on automobile and industrial branches of mechanical engineering and development work. Mr. Wall has been in the industry since its start

and has been most prominent in the development of the Society of Automotive Engineers.

Brandt Manages Foundry

A. J. Brandt, formerly manager of the Fisher Body plant at Janesville, Wis., on May 1 assumed new duties as manager of a new malleable iron foundry established at Oakland, Cal., under the name of Pacific Malleable Co., as a branch of the Forbes Malleable Co., Rockford, Ill. Mr. Brandt formerly was engineer of the Samson Tractor Co., and when this was liquidated and converted into branch Chevrolet and Fisher plants of General Motors, he was named manager of the body factory.

Pollock Heads Publicity Club

Melville A. Pollock, advertising and assistant sales manager of Rolls-Royce of America, Inc., has been elected president of the Publicity Club in Springfield, Mass. Mr. Pollock is chairman of a committee preparing for an Advertising and Industrial Exposition in Springfield, June 23 to 25, in which Rolls-Royce is to have a prominent part.

McMullen Is District Manager

George C. McMullen, formerly manager of sales of the industrial bearings division of the Timken Roller Bearing Co., has become district manager of sales of the Timken interests on the Pacific Coast, with headquarters in San Francisco. Harry H. Gildner, formerly in charge of the Chicago office, becomes manager of the industrial division at Canton, Ohio.

Erwin Appointed Sales Head

Walter B. Erwin, formerly vice-president of the H. L. Rackliff Co. of Cleveland and more recently associated with Lon R. Smith and Fred S. Wilson in the firm of Smith & Wilson, Inc., of Indianapolis, has been appointed sales and advertising manager of the Paraflector Co. of Minneapolis.

Tregenza Will Assist President

A. E. Tregenza, formerly sales manager of the Economy Fuse Manufacturing Co., Chicago, has been named as assistant to the president of the Chicago Fuse & Manufacturing Co., and will be in charge of commercial relations.

Lee Tire Promotes Pettingell

H. L. Pettingell has been promoted to the post of direct assistant to Harry E. Field, general sales manager of the Lee Tire & Rubber Co. He has been district manager working out of the New York branch, and has been with Mr. Field since 1912, when the latter was operating the Kelly-Field Co., which then held the sales franchise for Lee tires.

Piston Ring Makers Want Simplification

Government Is Cooperating in Effort to Reduce Great Diversity in Sizes

WASHINGTON, May 7—Cutting down of the present great diversity in sizes and dimensions of piston rings for automobile engines as a means of eliminating avoidable waste in production and distribution is engaging the Division of Simplified Practice of the Department of Commerce following the receipt of appeals from piston ring manufacturers.

It is the earnest desire of the interested firms to rid themselves of the burdens now imposed on them by the huge assortment of sizes which the manufacturers carry in order to serve the motorizing public.

Anxious to cooperate with representative bodies in the solving of this problem, the Division is now in touch with the Society of Automotive Engineers, the National Automobile Chamber of Commerce, the Motor and Accessory Manufacturers' Association, the Automotive Equipment Association, the newly formed Association of Cylinder Grinders and the American Automobile Association.

The piston ring makers recognize that the initial corrective effort must come from the engine designers and builders. That many of the engineers are in sympathy with the idea of fewer sizes is evidenced by the suggestions regarding desirable simplifications recently made by the members of the American Society of Mechanical Engineers to the American Engineering Standard Committee and relayed by that body to the Division of Simplified Practice.

Those suggestions include not only automobile motor cylinder bores and piston ring sizes but also other automobile parts, such as spark-plugs, ball bearings, springs, tires, rims, etc.

OLDS EXPORT BUSINESS

LANSING, MICH., May 6—For the first four months of this year export business of the Olds Motors Works shows an increase of 381 per cent over the corresponding period of 1923, the total being 2022, in comparison with 420.

Billinghurst Resigns

Allen D. Billinghurst, formerly foreign representative of the Federal Motor Truck Co. and later associated with the Autocar Co. as manager of the Cleveland and Detroit branches, has resigned. He is making his home in Detroit, with no immediate plans for the future.

Dealer Tire Stocks Held Not Abnormal

Estimated That on April 1, 1924,
Inventory of Casings Amounted
to 11,355,428

NEW YORK, May 7—It is estimated that there were 11,355,428 tire casings on the shelves of dealers throughout the United States on April 1, 1924. The basis for this estimate is the questionnaire asking for inventory data which was directed to a dealer list of 147,898 dealers in tires by the Rubber Association of America. In view of present practices in the tire industry this is not regarded as an abnormally heavy dealer inventory for this time of year and it is generally felt that conditions are much better than they were a year ago in this respect.

A significant fact developed by the questionnaire, however, is the overwhelmingly large percentage of so-called tire dealers carrying stocks of less than 50 casings each. This is interpreted by many as indicating that while the total number of tires on the shelves of the dealers is not abnormally large, it is so thinly spread over a great number of dealers as to make profitable trading a serious problem for many of them.

22,221 Made Reply

The total response to the questionnaire was 22,221. But, since 3909, or 17.59 per cent, of the replies received were to the effect that the addressee no longer was in the tire business, that percentage of "dead" names was applied to the whole mailing list, reducing the list of presumably "live" names of tire dealers to 121,883. The net usable responses numbered 17,797 and they represent 14.8 per cent of the "live" total list.

The 17,797 dealers reported inventories aggregating 1,648,993 casings, an average per dealer of 92 casings. However, more than half of the dealers were carrying very small individual inventories, as indicated by the following returns:

Dealers stocking:	Per Cent
Less than 50 casings.....	56.2
50 to 100 casings	23.5
100 to 200 "	11.8
200 to 300 "	3.7
300 to 400 "	1.6
400 to 1000 "	2.4
1000 and up "8

The total inventories reported by these dealers was:

Casings	1,648,993
Tubes	2,388,796
Solids	44,513
Cushions	11,036

Representative Response

A careful study of the returns seemed to justify the conclusion that the response was thoroughly representative and consequently the association built up the estimated total tire inventory of the country on this basis to a 100 per cent figure.

The results were as follows:

Casings	11,355,428
Tubes	16,498,602
Solids	306,347
Cushions	75,773

To the dealer inventory of the country may be added about 6,000,000 casings, the factory stock on April 1. This is not regarded as abnormal as compared with other years.

Climber Plant Bought and Will Be Operated

LITTLE ROCK, ARK., May 7—Dr. R. L. Saxon and John W. Dickinson have bought at receiver's sale the plant and assets of the Climber Motor Co., which has been in bankruptcy for a year, and have resumed manufacturing operations. The plant will be operated as the New Climber Co.

It will assemble the material now on hand and for the time being will sell direct to the consumer in this section of the country. In addition to making cars and trucks, the concern will also manufacture standard types of wood and steel truck bodies.

The property was sold for \$90,000, the appraised valuation at the time it was taken over by the receiver being \$426,000. The plant and land alone are reported to be worth \$250,000, comprising 21 acres of land and seven buildings.

Dr. Saxon is reputed wealthy because of the discovery of oil in the Smackover field, where he had large land holdings. Mr. Dickinson formerly was connected with the Big Rock Stone & Construction Co. The latter will be in active charge of the Climber plant.

More Exhibitors Take Equipment Show Space

NEW YORK, May 7—Additions to the list of exhibitors at the maintenance equipment show to be held in the General Motors building, Detroit, May 19 to 22, make certain that practically all of the available space will be occupied. More than 100 concerns have been booked for the display, which will be conducted under the auspices of the Service Division of the National Automobile Chamber of Commerce.

Those concerns which have been awarded space since the first allotment include:

Albertson & Co., Inc., Allyne-Zerk Co., American Sales Book Co., Ltd.; Automotive Maintenance Machinery Co., Battery Equipment & Supply Co., Berger Manufacturing Co., Clipper Belt Lacer Co., Comfort Printing Specialty Co., Cleveland Twist Drill Co., Fleming Machine Co., Greb Co., Hoe Corp., Husky Wrench Co., Louisville Electric Manufacturing Co., David Lupton's Sons Co., McQuay-Norris Manufacturing Co., Manufacturing, Equipment & Engineering Co., Monogram Lens Co., North East Service, Inc., Precision Truing Machine & Tool Co., Raybestos Co., Snap-On Wrench Co., Smith's Inventions, Inc., L. S. Starrett Co., Surface Combustion Co., Tinius Olsen Testing Machine Co., Timken Roller Bearing Service & Sales Co., United States Electrical Tool Co., Vellumoid Co., Vlcek Tool Co. and X Laboratories.

Brake Testing Code Will Be Formulated

N. A. C. C., Through Traffic and Safety Committee, Will Co-operate with S. A. E.

NEW YORK, May 6—The Society of Automotive Engineers, the Bureau of Standards and the American Automobile Association have been asked by the American Engineering Standards Committee to prepare a safety code on automobile brakes and brake testing for national application.

Preliminary steps with this end in view already have been taken by the S. A. E., which has asked the National Automobile Chamber of Commerce for cooperation. The Chamber in turn has referred the question to the N. A. C. C. Traffic and Safety Planning Committee, of which George M. Graham is chairman. Approval by the car manufacturers will have a stimulating effect on the movement to standardize brake tests, it is felt.

If the work is undertaken, the code will be designed to fill the urgent need for a standard specification applicable to present day conditions and susceptible of future modification, it being apparent from a study of both State and municipal regulations that no uniformity of requirements now exists. Furthermore, say those who are urging action, many of the present ordinances are entirely inadequate and others are perhaps unfair.

There is a probability that more ordinances relative to brake performance and inspection will be passed by States and municipalities and, if a satisfactory code can be formulated, it is felt that it should accomplish much toward unifying laws that are being passed and toward obtaining not more laws but more reasonable ones.

Already one conference of the sponsors has been held, at which problems relating to the requirements of such a code and the investigation necessary for formulating a standard specification were discussed.

South America Tractor Outlook Not Promising

MOLINE, ILL., May 7—With best horses offered at \$5 a head and fuel oil expensive, South America just now doesn't offer a very promising field for the American tractor, Harry F. Evans, vice-president and director of the foreign trade division of the new Moline Plow Co., said upon his return from a lengthy tour of Argentine, Uruguay and Brazil.

Germans and Austrians are coming into Argentine and Southern Brazil, Mr. Evans stated, but the country is readily absorbing this influx, and its ultimate benefit will be for American goods.

N. A. C. C. Publishes "Facts and Figures"

Latest Edition Places Total Output of Industry for Last Year at 4,086,997

NEW YORK, May 7—The 1924 edition of "Facts and Figures of the Automobile Industry" as compiled by the National Automobile Chamber of Commerce under the direction of John C. Long, manager of the Educational Department, is off the press and is ready for distribution.

The book revises some of the more important figures announced in the preliminary survey on Jan. 1 as to production, registration, exports, etc. The revision shows that the production for 1923 was 4,086,997 instead of 4,014,000, the increase being brought about by Ford's Canadian production, which was not included in the original estimate.

Wholesale Value Changed

The wholesale value of cars and trucks also is changed, the revision giving \$2,004,952,716 instead of \$2,510,885,000. The estimated grand total of wholesale values of the industry's work, including all replacement parts and tires, is \$2,804,952,257.

Motor vehicle taxes in 1923 amounted to \$471,548,000, according to the book, which includes for the first time municipal taxes, which last year reached a total of \$13,079,209, exclusive of property taxes on garages or local taxes levied on the retail business. Federal taxes amounted to \$157,707,255, made up of \$106,280,234, passenger cars; \$10,908,777, commercial vehicles; \$38,610,844, parts, tires and accessories, and \$1,907,399, vehicles for hire. State taxes reached \$300,761,802, made up of \$188,947,862 registration fees, including driver's licenses; \$36,813,939 gasoline taxes, and \$75,000,000 personal property taxes.

Placing the total registration for 1923 at 15,092,177, Mr. Long also tabulates the registration in 63 of the largest cities having more than 100,000 population. This shows New York with 363,590, and Chicago, 265,233. The Los Angeles count is 426,935, but that includes the entire county. The Detroit total of 230,594, also includes the county.

Most Trucks in Tacoma

Tacoma is estimated at 284,470, of which 122,333 are motor trucks, which makes Tacoma the leader in the use of commercial vehicles, New York City having 78,915 and Chicago 40,052. Of the cities in the 50,000-100,000 class, Fresno, Cal., is the leader with 45,670, of which 43,823 are passenger cars.

The book estimates that the capital invested in the motor vehicle manufacturing business is \$1,571,722,411, with \$579,002,686 spent for wages and salaries. There are 3,105,350 persons employed in the industry, of which 2,879,

370 are reported to be directly employed.

There are 318,100 motor vehicle factory workers; 300,000 parts and accessory factory workers; 114,750 tire factory workers; 181,000 motor vehicle dealers and salesmen; 135,000 supplies, accessories and parts dealers and salesmen; 110,000 garage employees; 90,000 tire dealers and salesmen; 345,000 repair shop employees; 470,000 professional chauffeurs; 60,000 gasoline refinery and oil workers, and 5500 automobile financing and insurance.

The number of car manufacturers is placed at 90 and motor truck manufacturers at 147.

Fryac Acquires Clymer; Concerns to Be Separate

CHICAGO, May 7.—Business, good will and assets of the Clymer Manufacturing Co. of Denver have been purchased by the Fryac Manufacturing Co. of Rockford, Ill. Operation of the two companies, both of which manufacture through-the-windshield spotlights, will be continued separately. Fryac continuing its offices in Rockford and Clymer in Denver.

The Clymer company will be under new management as a result of the deal, the former staff having retired and M. P. Corton, formerly sales manager, having been made general manager.

According to new policies adopted, the Clymer will retain its present distinctive features, including the trigger switch and pistol grip and, in addition, the Fryac windshield guarantee will also apply. This guarantee protects the dealer against the possibility of windshield breakage. If a shield is broken in the course of installing either a Fryac or a Clymer, the dealer will be reimbursed for the full cost of the windshield. The Clymer will be distributed exclusively through jobbers.

The consolidation strengthens the position of each company in the way of patents. Up to now the two concerns have cross-licensed each other, each holding basic patents which are being defended in the courts.

LINCOLN SETS WEEKLY MARK

DETROIT, May 7—All previous records for shipments were broken by Lincoln Motor Co. in the week April 21 to 26, when a total of 228 cars were delivered to dealers. The last high week record was in October, 1923, since which time numerous changes have been under way at the plant to provide for increased capacity and to increase the number of operations within the plant.

MRS. A. J. PICARD DIES

NEW YORK, May 7—Mrs. A. J. Picard, wife of the head of A. J. Picard & Co., automobile equipment distributor, and mother of R. A. Picard, sales manager of the Metal Stamping Co., died last week at her home in this city. She had been ill only a few days.

Tax Bill Starting Last Lap of Course

No Fight Is Expected in Conference Over Provisions in Automotive Section

(Continued from page 1045)

the Senate amendment with the House provision and the present law. The revenue derivable under the same section of the present law is \$11,000,000.

Mr. Edge. Is that confined alone to the automobile excise tax?

Mr. Smoot. And trucks.

Mr. Edge. I mean anything relating to automobiles?

Mr. Smoot. Just trucks. The House provision in relation to trucks would reduce the revenue to \$6,300,000. The Senate provision would make it \$300,000 less than the House provision by virtue of the addition of the words I have just read, "automobile truck bodies and automobile wagon bodies sold or leased in excess of \$200." That makes a reduction of \$300,000 from the revenue derivable under the House tax. I will say to the Senator the reason for that is that there are many manufacturers of truck bodies who make bodies alone and have nothing whatever to do with the automobile chassis. The committee felt that wherever those bodies were not in excess of \$200, they should not be taxed. It was a difference in the revenue of \$300,000.

Estimates Revenue \$6,300,000.

Mr. Edge. What is the approximate revenue?

Mr. Smoot. The approximate revenue is \$6,300,000.

Mr. Edge. The lowest amount, under the amendment eliminating trucks, under \$1,000?

Mr. Smoot. It would eliminate at least one-half of that amount.

Mr. Edge. Then what am I to understand would be the result if the excise tax was eliminated entirely from trucks? It is not whether it is \$200 over \$1,000, but the entire excise tax, which, in my judgment, is a tax that should be eliminated as rapidly as possible.

Mr. Smoot. Under the present law the revenue would be \$11,000,000 and under the Senate Committee amendment it would be \$6,000,000.

Mr. Edge. In other words, the committee has deducted about one-half of it.

Mr. Smoot. We have deducted \$5,000,000 out of the \$11,000,000. We gave the truck a reduction of \$5,000,000.

Mr. Edge. If we eliminate all of the excise taxes on motor accessories and trucks and everything associated with the motor industry, what would be the loss to the Government?

Mr. Smoot. It would be \$156,000,000.

Mr. Edge. What other excise taxes are left in the bill? We have eliminated the candy tax, have we not? What other excise taxes remain in the bill under consideration?

Mr. Smoot. Cameras and photographic material, fire arms and cartridges, etc.

May Become Law by June

Present indications are that the Senate will effect the passage of the entire revenue bill within the next ten days or two weeks. It then goes to conference and will be enacted into law, it is believed, by the end of May.

Too Much Politics, Says U. S. Chamber

Annual Meeting Holds Congress Responsible for Business Hesitation

CLEVELAND, May 7—Politics and congressional inaction on taxes are the chief causes for business hesitation, according to leading members of the United States Chamber of Commerce, which opened its twelfth annual meeting here yesterday.

A majority of the big business men seem to be out of patience with the record and lack of achievement of the present Congress and feel that production and distribution is being hampered because business cannot be certain what action the representatives in Washington are going to take regarding important questions.

Deplore Tax Plan Opposition

Opposition to the Mellon tax plan is being deplored, while considerable criticism is heard regarding the methods used by the various Senate investigating committees.

Aside from these political references, there is remarkably little open discussion of the probable trend of business during the next six months. Few speakers have made any direct reference to current business conditions, contenting themselves with a discussion of some specific problem, unrelated to immediate economic considerations.

Conversations with individuals indicate, however, that there has been a general falling off in all lines during the last month or two, but that serious depression does not exist anywhere at the present time. The general impression gained is that business men are not particularly worried about conditions, although some slowing up is admitted.

The automobile industry is not being affected by adverse conditions any more than are some other lines and not so much as some.

Farmer Condition Better

The farmer is gradually getting into better financial condition, according to Dr. W. M. Jardine, president of the Kansas Agricultural College. The farmers are better off today than they were a year ago, he says, and they will be in a still more favorable buying position in another twelve months. They don't need any legislation to help them. All they need is a fair chance to work out a program already under way. The farmer is not spending much money at the present time, Dr. Jardine says, but he is paying his debts. His regeneration is going forward slowly but surely.

George M. Graham, speaking before a group meeting on transportation, presented a complete picture of the function and achievement of the motor vehicle in the transportation scheme. He took a strong stand against the reckless driver

and urged that cars be taken away from those involved in accidents through carelessness, drunkenness or similar causes.

Results of the United States Chamber of Commerce Referendum on the report of the special committee on transportation show that all fourteen recommendations have been approved by large majorities. The recommendations included three of special interest to the automotive industry. One of these encourages the development of store-door delivery, another recommends that motor vehicle common carriers be subject to the same regulations as other common carriers, while the third recommends "that in addition to bearing the equitable share of the general tax burden, the road users should pay the entire cost of maintenance of improved highways through special taxes levied against them, such special taxes being applied exclusively to that purpose."

A recommendation urging the adoption of State laws where they are not now in operation, providing for certification of automobile titles, was approved by the insurance group this afternoon after Alfred Reeves, general manager of the N. A. C. C., had voiced hearty approval of the measure and offered the full co-operation of automobile manufacturers in forwarding its adoption by the various State legislatures.

Jewett Prices Reduced for Market in England

(Continued from page 1042)

total already has been more than 100 in all parts of England.

DETROIT, May 8—Price reductions on cars now in the British market are being announced abroad by a number of Detroit makers, especially those operating branches in London and other British cities. The reductions approximate the lower prices that will be possible if present tariffs are lifted, and are being made at this time to preclude any cessation of buying until the new tariffs become effective, which would not be until Aug. 1.

Because of generally good conditions in the British market for some time past, there are not a large number of cars on hand, factories report, but on whatever there are it will be necessary to take a loss either now or in August. Furthermore this condition will apply during the three months' period on all cars shipped, which will have the effect of limiting shipments to some extent.

OVERLAND AID ASSOCIATION

TOLEDO, May 7—The Overland Employees Mutual Aid Association, organized a little more than a year ago, now has 7050 members and a cash balance of \$11,685 in the treasury. A year ago the membership was 200. The organization provides sick and death benefits Co. here. Claims now run about \$1,000 a month. J. P. McKenna of the employees relation department is secretary of the association.

South African Trade Proceeds Cautiously

Will Not Permit Dumping of Cars No Matter How Good Business Outlook Is

JOHANNESBURG, SOUTH AFRICA, April 8 (*by mail*)—Car sales have slackened down a little lately owing to the approach of the show, but things, taken all around, are as good as can be expected and the automobile trade is certainly getting its fair share of business.

In other businesses things are not at all flourishing. The gold mining industry is paying good dividends, but wages have been cut and there is less money in Johannesburg than ever before. In the country districts the farmers have had a bad time, for South Africa has experienced the worst drought that has come this way for many years. Added to this, the locusts have played havoc with the crops in some parts, and now the rains have started and the clerk of the weather has gone to the other extreme. The rains are so late that they will do little good and may make the grass sour and thus affect the ranching outlook.

The automobile dealers are going carefully. Good as business has been and good as are the promises for the future, it is realized that on no account must too many cars be brought in. There must be no dumping and no forcing of vehicles on the public at low prices or specially favorable terms. A good feature up to the present has been the large proportion of cash sales.

New Cars Arrive

The latest car arrivals are the Oldsmobile Six and the Essex Six. A great deal of interest has been shown by the public in both these models, and the distributors here are pleased with the jobs. The Essex was driven from Cape Town to Bloemfontein over 1500 miles of veld and Karroo roads by Bain Campbell, who returned to South Africa with one of the new models.

Arthur Williams, South African manager for the General Motors Export Co., left here recently for America and expects to be away about six months.

The motor bus throughout the country still seems to be going along well, and new equipment is constantly being added. The position at present is that the various municipalities and the South African Railways have not been able to suppress the competition and appear to realize that the bus has come to stay.

FLINT PLANT MAKES RECORD

FLINT, MICH., May 5—Production of Flint cars at the local plant reached 200 cars last Friday, according to Sales Manager T. S. Johnston, the highest single day production in the history of the company. Mr. Johnston states that the plant now is running at a pace of about 200 cars a day at the present time.

Chairmen Appointed for Motor Congress

Men Prominent in Industry on Committees for Detroit Event This Month

NEW YORK, May 6—Committee chairmen have been chosen to handle the different features of the World Motor Transport Congress to be held in Detroit May 21-24. The selections include men prominent in the industry who will make every effort to keep the 100 or more delegates from all parts of the globe interested in the big convention.

John N. Willys, president of the Willys-Overland Co., and also chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce which is handling the congress, will be chairman of the session on automobiles and trucks and also the banquet chief. Howard Rees of the Hudson Motor Car Co. will handle the luncheon in honor of the delegates from Asia and Australia. William E. Metzger of the Columbia Motor Car Co. is to conduct the automotive educational tour, while Jay P. Rathbun of the White Co. will conduct the session on motor buses and taxicabs.

Other Session Chairmen

Percy Owen, chief of the Automotive Division of the Department of Commerce, will preside at the session on business promotion and R. J. Archer, export manager of the Willys-Overland Co., will handle the luncheon in honor of the delegates from the Americas. F. A. Bonham, Durant Motors, and chairman of the N. A. C. C. Service Committee, will conduct the session on service, while J. H. Teague of the Hupp Motor Car Corp. will take the delegates to the automotive maintenance equipment show.

The session on automotive finance will be led by E. W. Davenport of Kidder, Peabody & Co., and Howard S. Welch of the Studebaker Corp. will preside at the luncheon in honor of the delegates from the Near East and Africa. The inspection tour of the highways will be in the hands of Edward N. Hines, chairman of the Wayne County Highways Commission, while J. D. Mooney of the General Motors Export Co. will handle the highways session.

Personnel of Committees

J. Butler Wright of the United States Department of State will wield the gavel at the Government session, while to J. J. Palmer of Dodge Brothers has been assigned the luncheon in honor of the delegates from Europe. B. C. Budd of the Packard Motor Car Co. will handle the session on association activities.

As announced by Secretary George F. Bauer, the makeup of some of the committees having the World Motor Transport Congress in charge is as follows:

Automobiles and Motor Trucks—J. N. Willys, Willys-Overland, chairman; F. C.

IOWA BANKERS TO AID IN FINANCING FARMERS

DAVENPORT, IOWA, May 7—The Iowa Agricultural Corporation, incorporated with \$500,000 capital, is the first definite step of unified movement on the part of Iowa bankers to assist farmers in this State.

The corporation is intended solely for that purpose with a score of bankers all over the State on its board of directors. The purpose is to "benefit Iowa agriculture." The corporation will make loans and assist in financing the farmer.

Horner, General Motors; H. P. Stewart, Chandler; R. G. Hudson, Reo; D. C. Fenner, Mack.

Business Promotion—Percy Owen, Department of Commerce, Automotive Division, chairman; F. Dickerson, Hupmobile; D. A. Laing, General Motors; F. J. Fisher, Standard; J. C. Long, N. A. C. C.

Service—Frank A. Bonham, Durant, chairman; Coker F. Clarkson, S. A. E.; C. D. Vane, National Automobile Dealers Association; H. R. Cobleigh, N. A. C. C.

Motor Buses and Taxicabs—Jay Rathbun, White, chairman; W. W. Smith, Garford; F. L. Prince, Federal; Paul Moore, Service; G. H. Calhoun, Reo.

Asia and Australia Luncheon—Howard Rees, Hudson, chairman; H. B. Reynolds, Selden; Don Cameron, White; W. I. Irvine, Overland; Edward J. Norton, U. S. Department of State.

The Americas Luncheon—R. J. Archer, Overland, chairman; R. Hernandez, Cunningham; I. J. Miranda, Commerce; Fred Cardway, Pierce-Arrow; Edwin C. Wilson, U. S. Department of State.

Visit to Automotive Service Exhibit—J. H. Teagan, Hupmobile, chairman; Sydney H. Hale, Denby; Walter C. Davis, Davis; C. J. Helm, Acme; H. A. Latour, American La France.

Near East and Africa Luncheon—Howard S. Welch, Studebaker, chairman; E. J. Poxan, Dort; A. E. Southard, U. S. Department of State; R. S. Wiley, Auburn; Perry J. Stevenson, U. S. Department of Commerce.

European Luncheon—J. J. Palmer, Dodge Brothers, chairman; E. C. Morse, Wills Sainte Claire; M. H. Hoepfl, General Motors; Birger Jaenson, Gardner; A. E. Southard, U. S. Department of State.

Banquet—John N. Willys, Willys-Overland, chairman; Jay Rathbun, White; Howard S. Welch, Studebaker; John J. Palmer, Dodge Brothers; J. Howard Rees, Hudson; George F. Bauer, N. A. C. C.

Motorcycles—A. B. Coffman, Motorcycle & Allied Trades Association, chairman; J. Allan Smith, Ner-A-Car; E. J. Mueller, Cleveland; W. G. McCann, Indian.

PACKARD NEW YORK SALES

NEW YORK, May 5—Sales of new cars in April at the New York branch of the Packard Motor Car Co. were 443 cars, valued at \$2,200,000 a new high record both as regards number of units and money value. This compares with 433 cars valued at \$1,900,000 in April of last year.

German Delegation Lands At New York

Fifteen Representatives Come Here to Attend World Motor Transport Congress

(Continued from page 1043)

mobile paper. This action has slowed time sales. The Germans expect while here to complete arrangements with New York banking interests for a big fund which will permit of the importation of American cars without so much red tape as usually accompanies such a transaction.

Rail Program Prepared

NEW YORK, May 5—Railroad men will have their inning on the opening day of the World Motor Transport Congress at Detroit May 21-24, when the use of motor trucks by railroads and buses by street railway companies will come up for discussion.

As prepared, the card calls for an address on "Adjusting the Motor Vehicle to Railroad Requirements," by Sir Henry Worth Thornton, K.B.E., chairman of the board of directors and president of the Canadian National Railways.

"The Place of the Motor Bus in World Transportation" will be the subject of another address, following which there will be discussions on "How Are Motor Buses Being Developed to Meet International Needs," led by H. Weinberger, representative of A. Fross-Buessing of Vienna, Austria. John Hertz, president of the Yellow Cab Manufacturing Co. of Chicago, will speak on "The Taxicab in Its Economic Sphere, and S. Audi, president of S. Audi & Frères, Beyrouth, Syria, will discuss "How Is the Motor Vehicle Changing Local Transportation?"

Bakelite Is Developing New Automobile Finish

NEW YORK, May 11—The General Bakelite Corp. laboratories are developing a phenolic-resin varnish suitable for automobile finishing. Details concerning this material, which is similar in a general way to Bakelite varnishes now on the market, but possesses certain qualities which they do not have, probably will not be available until the new product is ready for the market several months from now.

It is expected that the new finish will be suited especially for finishing hoods, since it is unaffected by the high temperatures which the hood sometimes attains. It is said also to be entirely unaffected by exposure to the elements and therefore is expected to possess exceptional durability. It probably will be intended for baking at about 300 deg. Fahr. and is expected to be available in black and a number of colors.

Detroit Experiments with Daytime Garage

Industry Hopes That Parking Arrangement Will Tend to Encourage Ownership

DETROIT, May 7.—The erection of three downtown garages here, principally for daytime parking, is in the nature of an experiment by the industry itself, an experiment to determine if by providing suitable accommodations for persons desirous of using cars for transportation to and from work, shopping, and other purposes requiring parking in the downtown districts, the number of car owners in the city cannot be increased.

It is the feeling of many leaders in the industry, that because of the impracticability of using cars for many purposes in cities of the United States under present day conditions, there is a falling off in the desirability of car ownership, and that in some cases at least former owners have lost interest to the point of ceasing to drive cars. This condition has to be overcome that the interests of the industry may be protected.

Men of Industry Interested

These new garages here will be built by Detroit Garages, Inc., an organization which includes among its officers and directors some of the best known men in the industry. Edsel Ford is a director as are Roy D. Chapin and Howard E. Coffin. Immediate plans are for the erection of three buildings, all to be in operation by the latter part of the year. Two of the buildings are so located that they will serve for little else than day parking for tenants of the big office buildings. The third, more in the shopping, theatre and hotel district, will serve those visiting here and will also take care of day parking for office tenants.

Accommodations in these three garages will be for 1614 cars, increasing the present downtown parking space to room for about 4000 cars. The present space includes public streets, corner lots and the few garages already located in the downtown zone. There is no particular comfort for the owner seeking parking space in the knowledge that there is room for 2400 cars now, however, as to get one of these spaces often means cruising around for many minutes and often winding up 10 or 15 minutes' walk from place of destination.

Give Up Driving Cars

Under the circumstances many persons have given over using cars for usual daily transportation and are using cars, if at all, only for evening or week-end trips outside the city. This inability to use cars at all times and for all purposes is against the principle of the industry, that automobiles are a utility and can be used advantageously for practically all transportation requirements. It is

only a step further, according to some executives, when the popularity of cars will wane if such conditions cannot be overcome.

Therefore the operations of Detroit Garages, Inc., is a step to overcome the parking evil. In its inception it is strictly a Detroit proposition, working solely to work out evils here, but its experiences will be watched for their application to other cities where similar conditions exist. The men behind the organization feel that Detroit as the home of the automotive industry, and consequently most interested in eliminating all problems affecting it, should be the place at which all corrective measures should be worked out.

There is nothing essentially new about the types of buildings to be erected. They will be of d'Humy motoramp type. Floor levels are staggered under this construction permitting slight grades and broad full-vision ramps. Different heights of buildings will be employed, with number of cars to be accommodated varying according to evacuation possibilities of the streets on which they will be located. For this reason locations have been selected just off main traffic arteries, but at strategic points for quickly reaching them.

Rates for parking will be set to average about \$15 a month. For the accommodation of those requiring space daily there will be monthly and yearly rates,

(Continued on page 1056)

Detroit Electric Builds New Type Delivery Truck

DETROIT, May 7—Production has been started by the Detroit Electric Car Co. on a new type of electric milk delivery truck. The first of the company's product will go to the Detroit Creamery Co., which has made a series of tests with it.

The truck is built close to the ground, so the drivers can easily and quickly get in and out, and it can be operated from any of three points, the front and the two sides, at each of which there is a steering lever, a controller lever and a brake pedal. Running boards at the sides and decks suspended below the frame at the front and rear, tend toward accessibility from all points. The price of the truck is \$2,100.

Highway Trailer Starts Constructing New Plant

MILWAUKEE, May 8—The Highway Trailer Co., Edgerton, Wis., is starting work on the construction of a plant addition which will cost about \$100,000. This is in effect a partial replacement of the shops destroyed by fire July 4, 1922, with a loss of \$250,000.

Only recently the company was awarded a verdict of \$48,000 damages in litigation against the public utility furnishing power for the Edgerton water supply system, which failed to function properly.

The Highway company has been working in excess of capacity for some time.

Outlook in Northwest Good, Declares Vane

Returns from Six Weeks' Trip and Reports Feeling Is for Satisfactory Year

ST. LOUIS, May 5—C. A. Vane, general manager of the National Automobile Dealers Association, who has spent the last six weeks investigation conditions in the Pacific Northwest and Intermountain States, with W. B. Burruss, sales consultant of the association, declares that the outlook is the best of any in the past five years. He says the general feeling in all sections visited is for a satisfactory year and one that will be more profitable than 1923.

Shipping, mining, lumbering and farming in the States of Washington, Oregon, Utah, Colorado and Montana are on a progressively upward trend, he says, and with the influx of money for these industries buyers are increasing in the automobile markets.

Vane Summarizes Conditions

Reviewing his trip, Mr. Vane says: These States are just now recovering from the serious financial difficulties brought about by the deflation periods of 1920-21 and are just stepping into the favorable business cycle that the Eastern and Southern States experienced in 1922. Money is free and activity noticed in all lines of business.

California is experiencing a reaction due to the present of the hoof and mouth disease that deserves sympathetic understanding by all the country. Embargoes against California hay and grain crops and fruits and vegetables have created a situation for California dealers and distributors that commands understanding from automobile manufacturers.

The situation naturally has resulted in a slowing down of California motor vehicle sales and will mean that record breaking shipments to California points probably will be considerably curtailed. Hesitant buyers are staying out of the market until a settlement of the economic conditions brought about by the embargoes. California dealers and distributors were quite well stocked with motor vehicles in anticipation of spring trade and these stocks will have to be liquidated before the State is again the heavy purchaser it has been.

Conditions in Louisiana are excellent and would undoubtedly be in the same status in Texas and Oklahoma except for the lateness of spring. Mud roads sections of Texas and Oklahoma have been almost impassable for the past four months, due to heavy rains and snows. Crops are late in planting and buying activity curtailed until after the seasons catch up.

CORDUROY TIRE OUTPUT

GRAND RAPIDS, MICH., May 7—The Corduroy Tire Co. reports April as the best month in its history in volume of sales, and that the plant is now running to capacity, working twenty-four hours a day. The company states that it is making no tires for stock as the present production is only sufficient to take care of orders on hand.

Greater Production Expected This Month

Will Follow Increased Activity in Sales Field—Export Market Factor as Outlet

NEW YORK, May 5—In keeping with the slowing up in buying of automobiles the latter part of the first quarter and with the exception of a few parts of the country, extending into the second, production of cars and trucks dropped from 382,459 in March to approximately 337,000 in April. This represents a falling off of 12 per cent both from the March figure and from the 382,695 total reported for April a year ago.

The decline was not unexpected in view of the heavy production programs followed through the winter and spring months and the failure of the buying movement to start at the time anticipated. While a few companies shipped more cars in April than they did in March, shipments with the large majority fell behind.

Output for the first four months of this year aggregates 1,403,080 compared with 1,258,198 in the corresponding period of last year and for the six months starting with November it totals 2,019,255 as against 1,723,863 a year ago. May of last year reached the record breaking figure of 394,088, which will stand as the highest point in the production history of the industry until buying conditions materially improve.

Greater Sales Looked For

Although in some distributing centers it is felt that the present market shows merely a return to normal conditions following an exceptionally active buying year in 1923, elsewhere bad weather, hesitant business generally and the fact that this is a Presidential year are reported to be factors in keeping sales from mounting to previous high levels. Sales, without question, will show a great improvement this month with a resultant stepping up in schedules both in May and June.

With steady strides being taken in exports and every indication given that the movement forward will become more marked in succeeding months, the overseas market will absorb a greater proportion of the output of American automotive plants in the future than it has in the past. One of the most important developments looking to this end is the recent removal by Great Britain of all

duties covering automotive products entering England. The approaching lifting of the German embargo will also open a larger field for American products abroad and help in maintaining output schedules at a steady level.

The caution that is now in evidence with car producers is also featuring operations in parts plants. Activities with truck makers are greater than heretofore and preliminary reports point to April as one of the best production months in this branch of the industry.

Harrington Chosen Head of S. A. E. in Washington

WASHINGTON, May 3—A. W. Harrington, chief of the Engineering Section of the Q.M.C., Camp Holabird, was elected chairman of the Washington Section of the Society of Automotive Engineers at its annual election last night. The meeting marked the closing session of the 1923-1924 period.

Chester H. Warrington of Warrington Motors Co. retired as chairman and automatically becomes a vice-chairman of the Society. Conrad H. Young, mechanical engineer, was reelected secretary and treasurer.

Because of the inability of the speaker to attend, the scheduled meeting of the Society, which planned to take up "Traffic Accidents and Street Planning," was postponed and will probably be held early in the 1924-1925 season.

A general discussion was held on the question of standardization of automobile signals, and it was decided that no better work could be taken up by the engineers than to foster such a standardization program.

Paige-Detroit Announces New Suburban Limousine

DETROIT, May 6—Paige-Detroit Motor Car Co. has announced a new addition to its line, a suburban limousine which sells at \$2,895.

It is furnished in the de luxe type only. The body is similar to the seven-passenger sedan and has a partition back of the driver's seat, with a wide window which can be raised or lowered.

The Paige company also commenced shipments during April of the 6-70 chassis only, listing at \$1,500 f.o.b. factory. This is the first time that the Paige chassis has been sold separately.

NEW FORD TRUCK EQUIPMENT

DETROIT, May 5—Screen sides and canopy top are now being supplied by the Ford Motor Co. as additional equipment for the Ford 1-ton truck equipped with all-steel body and cab. With the screen sides and top, the truck has a loading space of approximately 114 cu. ft. The body is 4 ft. wide, 7 ft. 2 in. long and has a loading height of 4 ft.

31 Entries Reported for Race on May 30

There May Be Additions, How- ever, Before List Is Posted by Speedway Officials

INDIANAPOLIS, May 7—The advance entry list for the May 30th 500-mile Indianapolis motor speedway races shows 31 entries, including two cars not named by the drivers and ten cars with drivers not yet named. To date there are no foreign entries, but as entries mailed up to May 1 will be valid there may be additions to this list before the final official entry list is posted by the speedway management.

Seven Miller specials, four Durant specials, four Duesenbergs, and three Barber-Warnock specials give a field with plenty of assured speed and stamina.

The complete advance list follows:

Cars	Drivers
Sinclair Special.....	Herbert Scheel
Not Named.....	Earl Cooper
Durant Special	Harry Hartz
Roof Special	Jimmi Rossi
Duesenberg	E. Ansterberg
Miller Special.....	Tommy Milton
Schmidt Special	Not named
Wells Hornet	F. H. Wells
Miller Special.....	Jimmy Murphy
Durant Special	Eddie Hearne
Wade Special	Harlan Fenger
Not Named.....	Ira Vall
Dempsey	Elmer Dempsey
Miller Special.....	Ralph Hepburn
Duesenberg	P. Shafer
Durant Special	Fred Comer
Kess-Line Special	Not named
Barber-Warnock Special.....	Not named
Hartley Special	C. G. Hartley
Durant Special	R. C. Durant
Barber-Warnock Special.....	Not named
Duesenberg	Joe Boyer
Miller Special.....	Bennet Hill
Kess-Line Special	Not named
Mourre Special	Antoine Mourre
Miller Special.....	Not named
Duesenberg	Not named
Miller Special.....	Not named
Barber-Warnock Special.....	Not named
Miller Special.....	Jerry Wonderlich
Hoosier Special	Not named

Olds Lists Sport Model of Closed Car at \$1,245

LANSING, May 6—A deluxe sedan, described as the sport model of the closed car field, has been introduced by the Olds Motor Works. It sells for \$1,245, \$110 more than the price of the standard sedan.

The car is finished in maroon and is equipped with Tuarc steel disk wheels enameled in black with gold stripe. The equipment includes nickel radiator shell, bar radiator cap, Motometer, spotlight, running board step plates, windshield cleaner, rear vision mirror, front bumper, rear sport bumpers, sport tire carrier, four trunk rails on the back of the body, trunk platform and a black enameled steel trunk.

FINANCIAL NOTES

Mullins Body Corp. showed a net profit of \$69,460, after interest, etc., for the first quarter. This is equal, after preferred dividends, to 50 cents a share on the 100,000 no par value common shares outstanding. This compares with a deficit of \$6,460 for the preceding quarter and a net income of \$124,548, or \$1.05 a share on the common in the first quarter of 1923. Sales for the quarter were \$749,438, as compared with \$666,742 for the preceding quarter.

Moon Motor Car Co. reports for the quarter net income of \$202,368 after charges, equal to \$1.12 a share on the 180,000 shares of no par value stock outstanding. Total sales of cars, parts and accessories for the quarter amounted to \$2,607,889. Net sales were practically the same as in the same period of 1923, but the net profit was less owing to the absorption of the expense of putting the new Moon light six on the market.

Borg & Beck reports net earnings for the quarter before Federal taxes of \$107,356, compared with \$158,853 in the same period of 1923. Current assets were \$1,077,765 and current liabilities, including reserve for Federal taxes and dividends payable, \$263,346. Net current assets totaled \$814,419, an increase of \$20,096 over Dec. 31, 1923.

Spicer Manufacturing Corp. reports net profits of \$379,120 after interest, etc., for the first quarter, equivalent after preferred dividends, to \$1.01 a share earned on 313,750 shares of no par common. This compares with \$511,426, or \$1.42 a share in the first quarter of last year.

American Bosch Magneto Corp. reports net income of \$147,529, after depreciation and interest charges, for the first quarter. This is equivalent to \$1.53 a share earned on 96,000 shares of no par capital stock, compared with \$1.01 a share on the \$97,255 earned in the first quarter last year.

Rolls-Royce of America, Inc., reports \$313,239 net income last year, after reserves for depreciation, interest charges, etc., against an operating deficit of \$294,509 in 1922. The balance sheet as of Dec. 31 shows a profit and loss deficit of \$772,823, against one of \$1,086,063 at the close of 1922.

Mack Trucks, Inc. reports earnings of approximately \$1,450,000 after charges and taxes, for the first quarter in comparison with \$1,514,932 in the corresponding period last year. This is equivalent to about \$4.10 a share on the 283,109 shares of no par common after preferred dividend requirements.

Electric Auto-Lite Co. reports net profits of \$650,670 for the quarter. This is equal to \$2.60 a share on the 250,000 shares of no par value outstanding. This compares with net profits of \$809,921, or \$3.23 a share for the quarter ended March 31, 1923.

Timken-Detroit Axle Co. has declared the regular quarterly dividend of 1% per cent on the preferred stock, payable June 1 to stock of record May 20.

Kentucky Stockholders Receive Amended Offer

LOUISVILLE, KY., May 7—An amended offer in compromise by the Kentucky Wagon Manufacturing Co. in Federal Court this week presented to stockholders a plan whereby they would be given opportunity of accepting 25 per cent on unpaid debts under a prior compromise, or turning back all securities issued under the original order and accepting a flat 25 per cent settlement.

The offer was presented through James R. Duffin, attorney. The original settlement offer was made and accepted several months ago.

Under the original compromise plan, the Kentucky Wagon Manufacturing Co. delivered to creditors securities in the amount of 55 per cent of claims. The remaining 45 per cent in securities was retained by the company. The first proposal in the amended offer this week was to settle on a basis of 25 per cent of the outstanding 45 per cent.

Eleven creditors entered objections to the compromise offer. These creditors, according to Mr. Duffin, hold that the securities issued by the wagon company in compromise are valueless.

The 25 per cent settlement offer would be in cash, attorneys in the case announced. Creditors have been called to meet May 8 at the office of Judge George Du Relle, referee in bankruptcy, to consider the compromise offer.

The bankruptcy schedules of the Kentucky Wagon Manufacturing Co. listed liabilities of \$889,373 and assets of \$377,431.

New Citroen Engine Put in Car for Desert Use

PARIS, April 28 (by mail)—Endurance tests are now being carried out in Southern Tunisia with a new type of Citroen-Kegresse creeper band automobile for desert transportation. While the same general lines of construction have been maintained as on the earlier Citroen-Kegresse products, a more powerful engine, having a bore and stroke of 80 by 140 mm., is used, the rear axle has been redesigned, and heavier and broader rubber creeper bands are fitted.

The engine is the one which Citroen will fit in his six-passenger phaeton, to be put on the market next fall.

This new type of creeper track vehicle has been supplied to the British War Department, which probably will make use of it in Palestine. It is understood that both the Crossley and the Burford automobile companies, in England, are about to take up the construction of the Citroen-Kegresse vehicle for commercial transportation.

Ford Buys 1297 Acres for Activities in Ohio

SPRINGFIELD, OHIO, May 6—Henry Ford, head of the Ford Motor Co. and of the Detroit, Toledo & Ironton Railroad, which runs from Detroit to Ironton through Springfield, has purchased 1297 acres of land near South Charleston, this county, where extensive car shops, yards and Ford assembling plants will be located, according to reports current.

Officials refuse to discuss the project, except to admit that the land has been purchased. It is expected that Mr. Ford will exercise options on three more farms, making his holdings total 1882 acres. It is said he will build 400 houses for the accommodation of his employees. Building activities are expected to start this summer.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

The outstanding development in the business situation last week was the lowering of the rediscount rate of the Federal Reserve Bank of New York from 4½ to 4 per cent. Other features were a general upward movement of stock quotations following declines early in the week, further slight recessions in commodity prices, and some curtailment in basic lines of production.

The production of crude petroleum in the week ended April 26 averaged 1,941,050 barrels a day, as compared with 1,932,350 in the preceding week and 1,946,500 a year ago. The only declines during the week in average output were on the Gulf Coast and in Central Texas.

Business failures in April, according to Dun's compilation, numbered 1707 as against 1817 in March and 1520 in April, 1923. The current figure is the smallest monthly total since last November.

Fisher's index of wholesale commodity prices stood at 145.2 last week, touching the lowest point of the year to date, and comparing with 145.8 for the preceding week and 165 a year ago. Dun's monthly index of wholesale prices as of May 1 stands at 184.675, against 186.780 on April 1 and 192.044 on May 1, 1923. Bradstreet's index for the first of May is 12.5568, compared with 12.6574 a month before and 13.6665 last year.

Discounts Declined

Discounts by Federal Reserve banks declined \$25,700,000 during the week ended April 30, the decline being more than accounted for by the reduction in bills secured by Government obligations. Holdings of bills purchased in the open market declined \$15,900,000, while Government securities on hand increased \$27,400,000. The circulation of Federal Reserve notes declined \$14,800,000, while total deposits increased \$4,500,000 and total reserves \$7,800,000.

Loans of reporting member banks declined \$8,000,000 during the week ended April 23, a gain of \$16,000,000 in loans secured by stocks and bonds, being more than offset by losses of \$6,000,000 in loans secured by Government obligations and \$18,000,000 in "all other" loans. Investments increased \$3,000,000, while net demand deposits declined \$50,000,000 and borrowings at Reserve Banks \$5,000,000.

Interest rates on call loans showed the usual end-of-the-month firmness last week, rising to 4½ per cent, and later declining to 3½ per cent. Time loan rates were unchanged at 4½ to 4½ per cent.

MOLINE BODY ACTIVITY

MOLINE, ILL., May 7—The Moline Body Co. has announced production increases with prospects of force additions. The plant is at two-thirds capacity and men released two weeks ago have been recalled.

G. M. to Start Work on New Test Ground

Construction of Outdoor Laboratory in Michigan Will Take About Six Months

NEW YORK, May 5—Work will begin at once on the General Motors proving ground, which will be located in the neighborhood of Milford, Mich., and which will be used by the units of the corporation as an outdoor laboratory where their products may be put to practical test. The tract of land set aside for this purpose consists of 1146 acres and is within easy distance of Detroit, Flint, Pontiac and Lansing, where the corporation's main car plants are located.

The contract for the road work has been let to a Detroit concern, with W. J. Lehner of Mount Clemens, Mich., as engineer in charge of construction. The work of building more than eight miles of concrete and gravel roads, which will be used for testing cars, will take about six months, it is estimated.

Approximately two miles of concrete roadway, 20 ft. wide, will be built; one mile will be a perfect level, straightaway course, with 20 ft. gravel turns, and the other mile will be concrete road of varying grade, up to as high as 12 per cent. All of the concrete construction will be installed in accordance with the specifications of the Michigan State Highway Department, and the roads will be like the best of the State highways—and wider than any, except the chief trunk lines.

Six miles of 20 ft. gravel road will be built, with necessary culverts and fills, and there will be a wide variety of grade in these roads, reaching a maximum of 24 per cent, for test purposes.

A contract also has been let for the erection of a garage on the property, which will have a capacity of forty cars. The building will be 60 x 200 and will have complete laboratory and machine shop equipment. Later a contract will be closed for the erection of housing quarters for General Motors executives and for the operating staff at the proving ground, which will be under the direction of F. M. Holden. The housing quarters will furnish accommodations for thirty-five to forty people.

Newark to Establish Permanent Exposition

NEWARK, N. J., May 7—The Permanent Industrial Exposition, a national buying and selling center, is to be established on Newark's principal thoroughfare, Broad Street, at the turn of the Lincoln Highway.

Construction of the building has begun on a lot with a frontage of 309 ft. on Broad Street and a depth of 200 ft. The main structure will be seven stories in height, with a main floor with 64,000 ft.

floor space, which will be available for automobile displays. A special appeal is to be made to the automotive industry to take advantage of the opportunity to make permanent displays in this building.

There will be room for from 700 to 1000 manufacturers' exhibits under one roof, and it is believed that the display will have an appeal to world's buyers who visit New York. The Exposition also will specialize on sales distribution in the northern New Jersey area, including Newark and its suburbs, Jersey City, Hoboken, Paterson, Elizabeth and other populous localities.

INDUSTRIAL NOTES

Climax Engineering Co. is now operating its new and enlarged plant located at the foot of South Fourth Street, Clinton, Iowa, with the foundry located nearby. Besides making gasoline engines, the company is supplementing by developing crude oil engines of the true Diesel type, with capacity ratings of from 50 to 400 h.p., depending upon the number of cylinders.

Southside Malleable Casting Company, Milwaukee, suppliers of malleable iron castings to the automotive trade, has opened new quarters for its district office in Detroit in the General Motors Building. This office is to serve the Michigan trade. It is in charge of Frederick S. Lawrie, formerly of Milwaukee.

Better Market for Tops Is Expected in Poland

WASHINGTON, May 7—An important market for American automobile bodies in Poland is expected to result from the recent advance in Polish production costs following the shift of values to a gold basis on Jan. 1, Acting Commercial Attaché Rogers at Warsaw has advised the Automotive Division of the Department of Commerce.

Mr. Rogers says that a local automobile company, formerly importing a medium priced American chassis and manufacturing its own bodies, now finds that its cost for a standard torpedo body is about \$600, as compared with \$200 previously. Under these circumstances it can profitably import the body as well as the chassis. This, however, changes the tariff classification and necessitates the payment of the duty for both chassis and body in actual gold coin, which would not be necessary if simply the chassis were imported.

GETS LOWER RATES ON TOPS

DAVENPORT, IOWA, May 7—The Sieg Iron Co. has won a material rate reduction before the Iowa board of railway commissioners, securing a reduction of 75 cents a hundred on automobile tops. The new tariff will be effective within thirty days. The Sieg company handles large quantities of tops, and this favorable ruling will mean much to its business.

METAL MARKETS

Somewhat more settled conditions are beginning to make themselves felt in the market for steel products. For the remainder of the current quarter the leading interest's sheet-rolling subsidiary quotes 5.10 cents for full-finished automobile sheets which amid present market conditions makes that level the "outside" price. The nominal price for sheet bars is \$41, but this probably could be shaded. The market for ordinary steel bars is somewhere between 2.20 and 2.30 cents, Pittsburgh. The unfilled tonnage statement of the Corporation to be issued on Saturday, will undoubtedly reflect the general easing off in steel demand. The steel industry, however, is an old hand at weathering such situations as the one confronting it now.

Already sales managers give voice to the thought that underbuying now will lead to pressure on facilities later in the year, and, if their expectations are fulfilled, it goes without saying that prices then will be such as to sweeten the average for the year and to make up for the recessions that have lately taken place. It is not at all precluded that this recession may not be put to good use. The Keystone Coal & Coke Co., a leading producer of high-grade foundry coke, has announced wage reductions of 15 to 20 per cent. With one blast furnace after another going out of commission, the stage is set for a readjustment of production costs—unless demand should reassert itself so emphatically that prices mounting once more by leaps and bounds force a resumption of production.

The impression that automotive consumers are out of the market is altogether erroneous. Not only is there a regular amount of routine business, but inquiries for larger tonnages are out. Automotive buyers are cautious in their commitments, but they have by no means turned their back on the market. Hot and cold-rolled steel and alloy bars are moving in small tonnages. The market for bolts and nuts is weak and dull.

Pig Iron.—Curtailment in production has now reached a point where even the slightest reawakening of demand plus manipulation of the market, which is always easy under such conditions, will surely result in a swing of the market's trend the other way from which it has been pointing to of late. Both foundry and malleable have been offered lately at \$21, Pittsburgh, without melters taking on more than retail lots. Of course, the possibility of foreign competition acts as a barrier to too sharp advances, but the pig iron market will certainly bear watching from now on.

Aluminum.—At the time when the aluminum market eased off perceptibly on this side of the Atlantic, British consumers of ingots encountered considerable difficulty in covering their requirements. Latest London mail advices quote the market there at £125 per gross ton, compared with £115 earlier in the year. Canadian ingots from the Dominion plant of the sole American producer were quoted £5 under the price of British ingots. While the London market was denuded, heavy tonnages of ingots poured into New York from Norway. Obviously the markets of the world have become a checkered board on which those in command of the aluminum situation can arrange the supply so as to reap the richest harvest.

Copper.—Slightly improved demand for domestic requirements is noted but automotive buying of copper and brass products is still light.

Lead.—Buying by storage battery interests is in abeyance.

Calendar

SHOWS

Jan. 3-10—New York, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Bronx Armory.

Jan. 24-31—Chicago, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

FOREIGN SHOWS

May 10-20—Madrid, Annual Automobile Show, under the auspices of the National Association of Automobile Importers, Palacio del Helo y del Automovil.

May 23-June 1—Oporto, Portugal, Automobile and Aviation Exposition, Exposition Offices, 108 rua de Santa Catarina, Oporto.

May 31-June 15—Turin, Italy, Automobile Show.

Aug. 23-Sept. 6—Toronto, Ont., National Automobile Show in conjunction with the Canadian National Exhibition under the sanction of the Canadian Automotive Equipment Association and the Automotive Industries of Canada.

Oct. 2-12—Paris, passenger cars, motor cycles, bicycles and accessories, Grand Palais.

Oct. 17-25—London, Annual Passenger Car Show, Olympia.

Oct. 22-31—Paris, motor trucks, stationary engines, garage tools and machine tools, Grand Palais.

RACES

May 30—Indianapolis.

June 14—Altoona.

July 4—Kansas City.

Aug. 3—Lyons, France, European Grand Prix.

Sept. 1—Altoona.

Sept. 1—Syracuse.

Oct. 4—Fresno.

Oct. 19—Kansas City.

Nov. 24—Los Angeles.

CONVENTIONS

May 19-22—Detroit, National Automotive Service Convention and Maintenance Equipment Show, under the auspices of the Service Division of the National Automobile Chamber of Commerce, General Motors Building.

May 19-23—Atlantic City, National Electric Light Association.

May 21-24—Detroit, International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

May 26-29—Cleveland, American Society of Mechanical Engineers.

June 3-4—Detroit, Midsummer Meeting of the Automobile Body Builders Association, Hotel Statler.

June 4-6—Boston, National Foreign Trade Convention.

June 23-25—Atlantic City, American Society for Testing Materials.

June 23-25—National Team and Motor Truck Owners Association.

June—Washington, Pan American Highway Congress, under the auspices of the Pan American Highway Mission.

Sept. 7—Monza Track, near Milan, Italy, Italian Grand Prix.

Sept. 22-26—Boston, Sixth Convention and International

Steel Exposition of the American Society for Steel Treating.

S. A. E. MEETINGS

May 13—Pennsylvania Section, Motor Bus Design and Operation, A. E. Hutt.

May 15—Metropolitan Section, Repainting, Dr. A. H. Sabin, National Lead Co.; L. V. Pulsifer, Valentine Co., and E. M. Flaherty and O. H. Briggs, Duco.

May 22—Detroit Section, How the Engineer Can Help Solve the Service Problem, H. N. Davock, Packard; O. E. Hunt, Chevrolet; W. T. Fishleigh, Ford.

June 24-27—Summer Meeting of the S. A. E., Spring Lake, N. J.

Oct. 21-24—S. A. E. Production Meeting, Detroit.

Nov. 18-19—Joint Service Meeting of the S. A. E. with the N. A. C. C. Cleveland.

—Aeronautical Meeting at Dayton at the time of the Pulitzer Races.

January—S. A. E. Annual Meeting, Detroit.

Motorists Told Road Work Waits on Them

MILWAUKEE, May 8—A campaign of education to make motorists realize that they are face to face with the fact that the good roads movement cannot continue unless they are willing to carry a larger share of the cost has been instituted by the Wisconsin Good Roads Association, in anticipation of the next biennial session of the State Legislature, which convenes in January, 1925. Legislative elections will be held in November.

Francis A. Cannon, secretary of the association, says:

Today, just as much as ten years ago, when the good roads movement was in its infancy in Wisconsin, there is needed a campaign of education to place before the people the facts and constructive suggestions of the methods necessary to meet the problems. What we need at this time is education as to the financial features of the road problems—the methods by which funds shall be raised for highway improvement, and the efficient and economical administration of these funds.

This is a question which should interest every motor vehicle owner in Wisconsin. He is face to face with the fact that the road movement cannot continue unless he is willing to carry a larger share of the burden—to pay the larger part of the bill. Without entering into any discussion of the economic justification of this demand, as a practical problem it is settled by the consideration that general property has borne by far the largest part of the burden heretofore and cannot be loaded with an increased increment of taxes for road improvement.

The motorist has his choice of paying a bill for bad roads in increased cost of gasoline, oil, tires and repairs, or paying the bill for good roads in the form of heavier imposts on these vehicles. He will find the bill for bad roads far larger than the taxes necessary to get good roads.

A gasoline tax of 2 cents a gallon was contemplated by an act passed by both branches of the Legislature at the 1923 session, but was not effective because it was vetoed by the governor, who condemned it on the principle that such a levy is purely and simply a sales tax and thus fundamentally wrong. Motorists' organizations generally are leaning more and more toward a gasoline tax as the most practical solution of their problem of meeting their responsibilities in taxation for highway work.

Trolleys Voice Friendly Feelings for Industry

NEW YORK, May 5—Coincident with the celebration of the thirty-sixth birthday of the electric railway industry yesterday, the American Electric Railway Association issued a statement as to the present situation in the trolley world in which it emphasized the friendly feelings the street railways have for the motor vehicle. It says:

"Contrary to general opinion, national electric railway and motor car interests are not attempting to cut one another's throats. They believe that there is room for both the electric car and the motor bus in local transportation and are trying to cooperate."

NEW YORK POLICE INSPECTION

NEW YORK, May 5—The annual inspection of the Police Department is now on and will continue to May 19. The police are stopping every car on the streets, examining them as to the condition of brakes and mechanical condition, and also noting engine numbers in the hope of tracing stolen cars. Each car after examination is tagged to avoid a repetition of the inspection.

Detroit Experiments with Daytime Garage

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but there will also be room for the occasional user. Those engaging space by the month or year will pay a lower rate than transients, but the whole theory of rates will be worked out on a basis of a return of about \$15 a month to the proprietors. This compares with the present usual open lot rates of 25 cents per park.

As has been outlined, the whole theory of the Detroit Garages plan is to do something of a definite and constructive nature to make practical the use of cars during business hours in the downtown district. It is not seeking to erect buildings for night storing in the residence districts principally because this city, and for that matter most cities of the country, has as yet plenty of private and public garages that can be used for this purpose.

Many of the leading spirits of the industry have been studying plans which might be applied in meeting lack of garage conditions such as exist in New York, and something may be worked out in the near future from the experiences under this plan that would aid in New York and other cities.

There is no suggestion of the financing of an organization that would meet garage conditions in all cities, but there is the definite belief that the success of this organization here will result in the location of similar organizations in all cities. Possibly some of the money represented in the Detroit company might be enlisted in others, but this would have to be after the Detroit organization has had opportunity to function and demonstrate its capabilities.